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Efficient Arrangement of Machine Tools Goes Hand in Hand with Modern Machines

WHEN costs of turning steel wheels are compared, as in this issue, in the second survey article on wheel, gear and axle practice, a great variation is found. This is because the time required to turn a pair of steel wheels and the resulting cost of the operation depend on several factors. These include the skill or efficiency of the workman, the adequacy of the wheel lathe, condition of the cutting tools, the handling devices provided for getting the wheels to and into the lathe, the arrangement of the shop, layout of machines, convenience of storage space, and finally the condition of the wheels to be turned.

In general, the machine tool equipment for wheel and axle work is good only here and there in electric railway shops. A few railways have installed new wheel lathes or boring mills. Others have overhauled old tools and rearranged their shops to increase output. In all of these shops a marked improvement has resulted. By installing a new wheel lathe, using high-speed tool steel, and increasing the cutting speed, one road is taking care of wheel turning with two men where nine were used previously. The saving in labor alone will pay for the initial investment in two years.

Another shop had an excellent wheel lathe of late type, but the handling devices were entirely inadequate. The space for bringing wheels to and taking them away from the lathe was so cramped that one operation interfered with the other. Wheels were allowed to accumulate around the lathe to such an extent that the work of getting wheels into and out of the lathe was hindered. Furthermore, very little attention was being given to the quality and condition of the cutting tools, so that the lathe was operated at a slow speed. At this shop one machinist and a helper turn from eight to ten pairs of wheels in an eight-and-one-half-hour day, while at another shop, equipped with the same type of wheel lathe, but where particular attention has been given to handling devices, machine location and cutting tools, a man and a helper turn from sixteen to eighteen pairs of wheels in nine hours.

Railway shopmen are anxious to make a good record, and they work to that end when sufficient attention is given to the matter of tools and working conveniences, and to training of the men in modern shop methods. In the case just given, the output obtained from a $22,000 investment was only 50 per cent of what it might have been with proper handling equipment and sufficient space for doing the work, which could have been provided for an additional investment of less than $2,000.

Better cutting tools will prove a good investment. There is little use in spending money for an up-to-date wheel lathe unless the tools used on it will allow the machine to be operated at its full capacity. Tool grinders were found in most of the shops visited in making this survey, but there was a wide variation in the way tools were ground. Even in the same shop, different machinists had different ideas of the angle, clearances and rake to be given tools, and they insisted on the tools they used being ground in accordance with their own ideas. By determining the best practice and making this uniform, much can be gained.

Modern machine tools applied to railway shop work are capable of economies that managements should know about. Improvements in present machines and their location in an effective plan should be considered, for in many cases good savings can be effected by this means, although this may be considered a substitute for a better plan, namely, new tools.

The Engineer in the Equipment Department

IN THE recent Annual Convention Number of the JOURNAL reference was made to the necessity for properly trained engineering organizations in the equipment departments of electric railways. It was pointed out that such an organization is necessary for the formulation and maintenance of company standards, and that through such work it can effect large economies by cutting down repair part stocks and eliminating costly maintenance delays.

Even on the larger electric railways there are very few instances where such engineering organizations have been developed to a degree warranted by the importance of the work to be done. On many properties the engineer in the rolling stock organization is entirely engaged in the work of preparing drawings for either new car construction or repair work. On other properties he is entirely occupied in experimental work. His work is frequently looked on as of a rather minor nature and he is frequently a comparatively young and inexperienced man who is willing to accept the compensation offered in order to broaden his experience.

Even these initial steps in the formation of an engineering division are to be commended, for there are too many instances on properties of considerable size where all development as well as routine maintenance is carried out entirely by shop foremen or mechanics under only the general supervision of the department head. In the interest of what is considered economy, very few drawings of any kind are prepared by the railway and new parts are made or ordered largely from samples or manufacturers' description. This limits the source of supplies, as many manufacturers cannot compete for the business because of incomplete information on the requirements.

It is time that the place of the engineer of equipment in the operating organization of the electric railway be recognized. In no branch of the industry is there an opportunity for greater direct economies from the appli-

cation of engineering methods of study and analysis than in the rolling stock and shops department.

The engineering division, in addition to carrying out the work of standardization which was discussed in the convention issue, should also include under one head all experimental work, all preparation of drawings and the studies of manufacturing and maintenance practices. To do this effectively the engineer of equipment should not be submerged in the maintenance organization but should be a member of the staff of the department head.

Most important of all, perhaps, in summing up the reasons why railways should maintain an equipment engineering division is the stimulus that this would supply in the general development of the electric rail vehicle. With all these engineers relieved of the burdens of routine maintenance and constantly thinking individually and collectively along lines of how to obtain better designs and more suitable materials, the cumulative effect in the industry would produce a much more rapid rate of development than has prevailed during the past ten years or so, during which the bulk of development work has been that done by the manufacturers due largely to competition.

What Is a Good Superintendent of Equipment Worth?

ON JULY 1 of a recent year a certain large railway company owned 633 cars, out of which only 360 were in service. This means that 273 cars were either in bad order or stored as obsolete. The number of pull-ins per day was averaging ninety, or 25 per cent of the cars in service, and the cost of conducting the mechanical department was $1,300,000 a year.

With this as the situation, a new superintendent of equipment took charge. During his first year the expense of operating the mechanical department dropped to $970,000, though ninety-five new cars were purchased whose maintenance was added to the work of the department. At the end of two years, with 728 cars total owned, the company had actually scheduled 690 cars. Only thirty-five cars were being held out for everything—wrecks, bad order, painting and general overhaul. The number of pull-ins per day was running from twenty-five to thirty, which is about 4 per cent of the cars in service, and the annual expense of the mechanical department had been cut to $820,000. For completeness, this record of accomplishment should include a notation that of the motors which had to be maintained about half were from twelve to twenty years old.

How was it done? One of the first steps taken by this new superintendent of equipment was to install a system which enabled him to know his costs. He organized the shops for maintenance work and got some new machine tools and employed some first-class mechanics. The investment in the new shop tools was quickly gotten back out of the savings resulting in labor and the more rapid production. The old motors were put in shape and a systematic overhaul program inaugurated. The whole difficulty in the past had been deferred maintenance and a careless planning of work.

What is a superintendent of equipment of these abilities worth? He made a saving of nearly half a million dollars in two years time in the annual cost of operating the mechanical department. But even more important than that, he increased the number of cars available for service, and therefore improved the company's ability to earn revenue, from 360 cars to 690 cars.

But what was this man paid? His annual salary was about 1 per cent of the saving he had been able to make, and it was only 0.6 per cent of the reduced annual expenditure of the mechanical department. He left the company after two years to accept a more lucrative position offered him in the manufacturing field.

When a man of this ability has demonstrated his worth, one would think that a railway company would not permit any one to deprive it of his services. The need for skill in railway maintenance work and the opportunity existing for making large savings are very great. Ability applied here should be paid for just as well as anywhere else.

Wood Preservation Means Forest Conservation

FOREST conservation is an extremely important national problem in this country, as this paper has pointed out at various times. Likewise it is one of growing seriousness as the timber is cut and not replaced. The situation is well expressed in the words of the late Joyce Kilmer:

> "Poems are made by fools like me,
> But only God can make a tree."

Even this does not tell the whole story because it does not tell how long it takes God to do the work. The rapidly disappearing forest is not a myth. It is a fact only too well understood by our Forest Service but unfortunately not yet appreciated by a great number of the larger consumers of timber.

There is, however, a method of conserving timber which is open and available to every one; that is, the preservation of it by certain well-known methods of treatment. The wood preservation committee of the American Electric Railway Engineering Association, which functioned for the first time this year, gave a great deal of information in its report as to how treatment of wood for railway purposes may be accomplished. The methods of treatment which are discussed in the report are such as are available to practically every user of timber. Their application will increase the life of the timber a great deal, the better methods making the life more or less indefinite. In fact, mechanical wear is the cause of most failure of timber thus treated. The results to be obtained from the various methods of preservation are fairly well known and guesswork has been practically eliminated.

Despite the work that has been done in the preservation of wood, the use of preservatives is not spreading as rapidly as would be desirable for the good of our forests. Figures presented elsewhere in this issue show that the amount of wood being treated at the present time is but little in excess of the amount being treated ten years ago. While this is due to some extent to policies of retrenchment that have been in force, still a great deal of untreated wood is used where proper preservative methods should be applied. The work of the wood preservation committee should bear practical fruit if its efforts result in a greater attention to treatment of timber.

It takes many years to reap the benefit of reforestation, but the benefits of wood preservation are available at once, and its immediate adoption would greatly lighten the burden on our already overtaxed forests. Wood preservation is an economic necessity which must sooner or later be recognized by every industry using wood for structural purposes.

Wheel, Gear and Axle Practice—II

Efficient Arrangement of Machine Tools with Ample Provision for Placing Material Into and Taking It Out of Machines Reduces Cost and Time Necessary for Wheel and Axle Work—Storing Both Rough Material and Finished Products Adjacent to Machines Where Work Is Done Has Advantages—Savings Possible with Modern Machine Tools

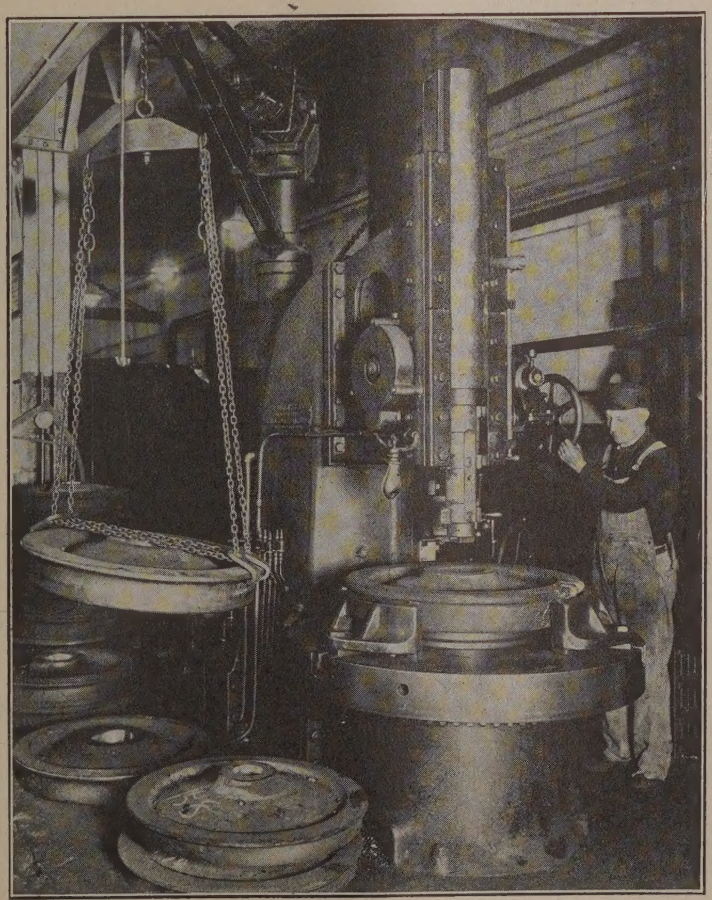
The first article on this subject was published in the ELECTRIC RAILWAY JOURNAL *for Aug. 18, 1923. It contained information of the mileage obtained and costs resulting from the operation of cast iron and steel wheels, together with a discussion of some conditions that limit the life obtained from wheels and the expedients used to increase mileage of wheels in service. In this, the second article of the survey, methods, equipment and shop arrangement used in maintaining wheels and axles are treated.*

IN CONSIDERING the various shop layouts of the sixty railways visited in making this survey it was found that in most cases the machines for wheel and axle work were grouped in one section of the shop. This proves particularly effective in reducing the number of times that wheels and axles must be handled and it also reduces the amount of handling equipment needed. Where railways have several shops at which inspection and overhauling are done, wheel and axle work is quite generally centralized at one shop. On most of the larger railways the system is organized into divisions, and wheel and axle work for the different divisions is done at the shop most centrally located. Wheels and axles requiring maintenance work for the different divisions are sent into and returned from the wheel and axle department on supply cars. These supply cars are usually provided with a derrick for quick handling. The larger systems have a definite schedule for the operation of such supply cars and by this arrangement a single car and crew can take care of the entire distribution. On one system the supply car was said to average only 180 miles per six-day week. This shows how great a saving in mileage can be made by bringing car equipment to the places where the cars are housed rather than by running the individual cars to a distant shop for every change in wheels or axles.

The equipment in the wheel and axle departments will vary, of course, with the number of cars and the variety of wheels used. Where steel wheels are used the wheel and axle department will ordinarily have a wheel press, boring mill, wheel lathe and axle lathe. In addition some shops have an axle straightener, welding machine for building up flanges and axles, and a few have a milling machine for cutting key ways. Railways using cast iron wheels in most cases have a wheel-grinding machine of some form, either pit type or floor type.

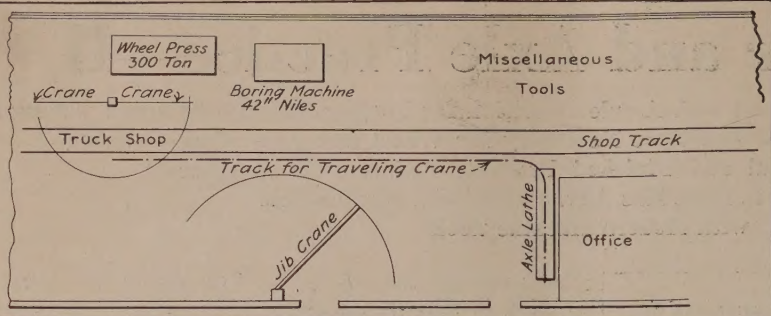
The wheel presses used for electric railway service run from 250 to 400 tons capacity, with a large majority using the 300-ton size. Wheel lathes and boring mills are used in sizes from 34 in. to 48 in., with a majority of roads favoring the use of the 42-in. size. Axle lathes are used in sizes from 20 in. to 36 in. Jib cranes are quite universally used for serving the individual machines, with some provisions for moving the wheels and axles about the department, or to and from storage by either overhead traveling cranes, traveling trolley hoists or wheel and axle wagons.

A convenient and well arranged wheel storage is a great time and labor saver. A very satisfactory arrangement is used at the Chattanooga shops of the Tennessee Electric Power Company. A concrete platform has been constructed at the sides of the shop on the same level as the shop floor. One of the yard tracks runs alongside the platform so that wheels can be loaded readily on and



Boring Mill in Boston Elevated Railway Shop, Equipped with 15-Hp. Motor and with 1,000-Lb. Air Hoist

The tool spindle of this boring mill has provision for three tools, one for making the rough cuts, one for the finishing cuts and one for the fillet cuts. The various cuts can be made without changing the position of the wheel on the bed.



Platform for Wheel Storage

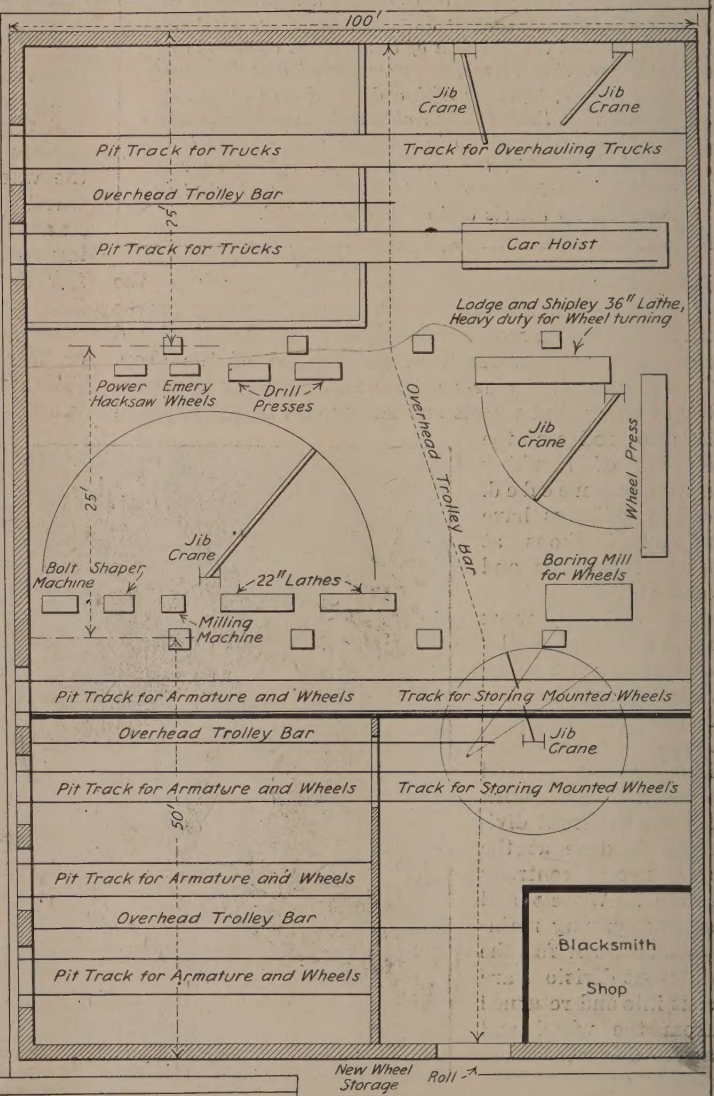
Wheel and Axle Work at Terre Haute, Norfolk and Chattanooga

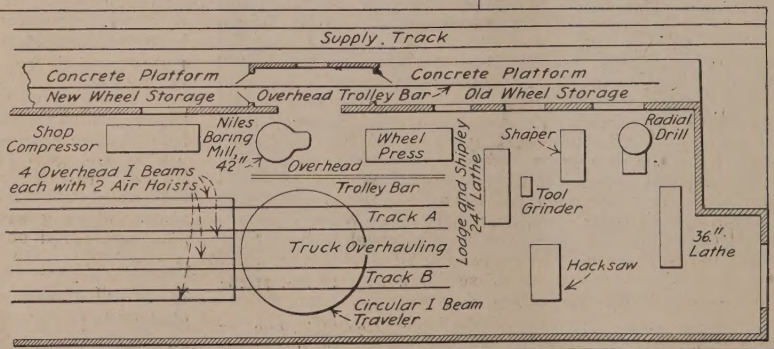
In the shops of the Terre Haute Traction & Light Company, shown in the top plan, a wheel press, boring mill and axle lathe are all located adjacent to the truck overhauling track. Three jib cranes and an overhead traveling hoist are used for handling the wheels and axles. Wheels that require removal are taken to the wheel press and axles that require turning to the axle lathe by the overhead traveling hoist. New wheels are stored on a platform just outside the shops. After rolling in through an adjacent doorway, they are handled by a jib crane and the overhead traveler to the boring mill for boring. After finishing, they are sent to the wheel press for mounting. From here the wheels are rolled and handled by the crane to storage, which is on shop tracks outside the shop. Wheels are turned by the use of an oxy-acetylene torch as described in the ELECTRIC RAILWAY JOURNAL for July 21, page 104, and as a result a wheel lathe is considered unnecessary.

Handling Wheels and Axles at Norfolk— The wheel and axle department of the Virginia Railway & Power Company, Norfolk, Va., shown at the right, is located at the end of the shop between tracks used for truck overhauling and for general inspection work.

Wheels that have reached their limit of wear are handled direct from the truck overhauling track to the wheel press by means of an overhead trolley hoist. A jib crane is also conveniently located to serve both the wheel press and wheel lathe. New wheels are stored on a concrete platform outside of the shop. They are rolled from this storage to a doorway and from that point are handled to the boring mill by the same overhead traveling hoist which runs entirely across the shop. After finishing and mounting, the wheels are stored on two tracks adjacent to the boring mill. Axle work is done on two lathes adjacent to the wheel boring mill. This arrangement of jib cranes and overhead traveling hoists is particularly effective for handling various equipment parts.

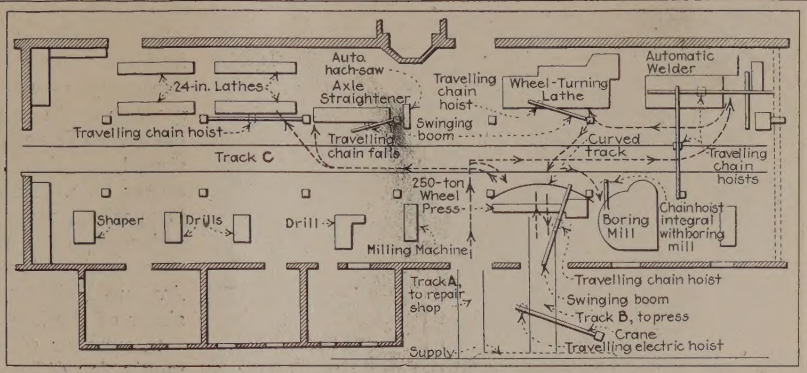
Arrangement of Wheel Work in Shop of the Tennessee Electric Power Company—The wheel and axle department of the company in Chattanooga, shown in the lower plan, is adjacent to the shop overhauling tracks. Supplies are delivered to a concrete platform along the side of the building and are handled from this storage to machines. A circular I-beam traveler reaches across the two truck overhauling tracks, as described in the ELECTRIC RAILWAY JOURNAL for July 21, 1923. The front end of the overhauling track is equipped with four overhead I-beams, each with two air hoists for convenience in lifting car bodies. Wheels that have reached their limit of wear are taken from the truck and handled by an overhead trolley to the wheel press. From the boring mill, wheels are handled to the wheel press by the overhead trolley bar.

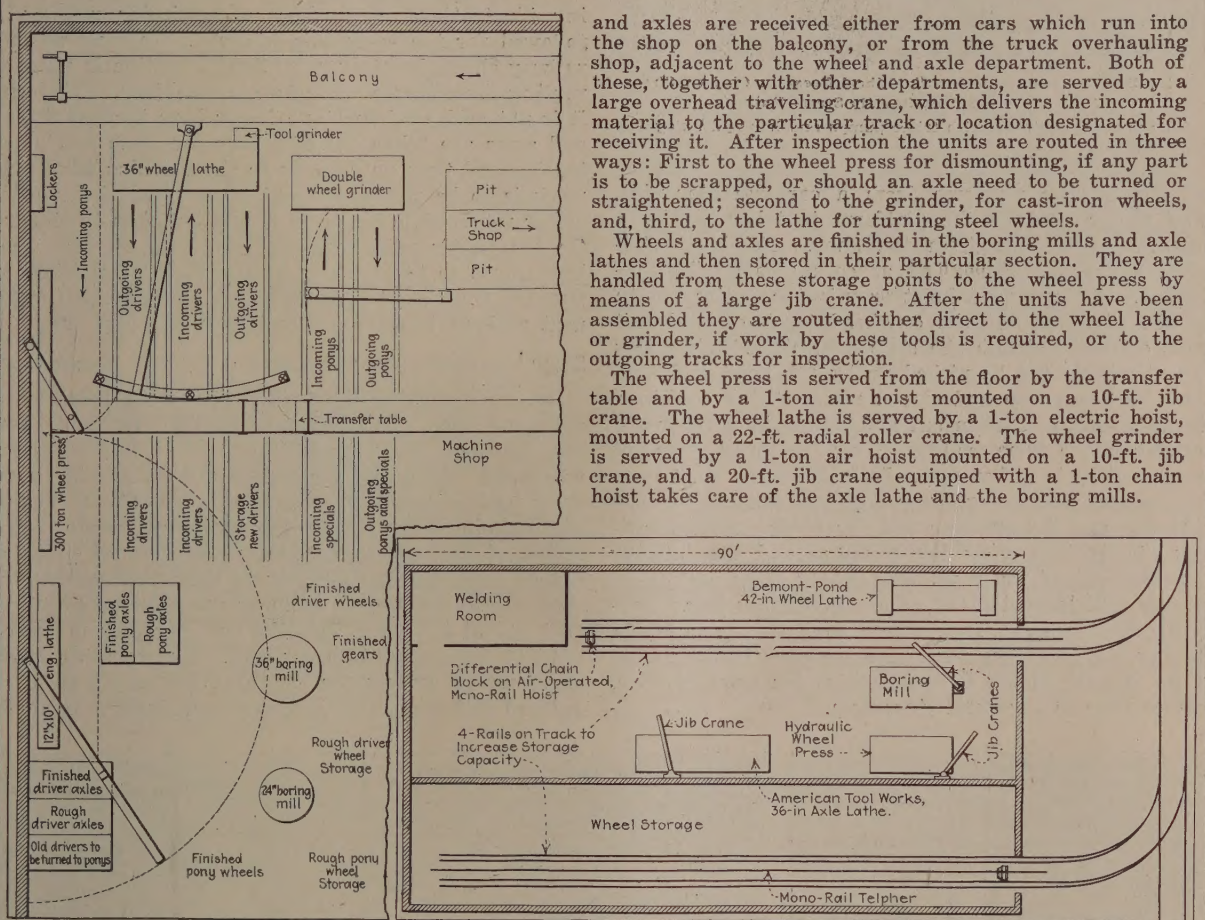




Eastern Massachusetts, Third Avenue and Puget Sound Companies' Practice

The Chelsea Shops, shown at the right, handle all wheel and axle work for the Eastern Massachusetts Street Railway System. A supply car picks up the wheels and axles requiring repairs and brings them in. The wheels are unloaded by a crane and placed on tracks A and B. Wheels with worn flanges are placed on track A and are then rolled into the main-aisle track C. A telpher removes the wheels from this track and places them in position in the automatic welder, where worn flanges are built up. After this operation the wheels are again removed by the same telpher system and by a swinging post derrick which serves the wheel lathe. After turning wheels are placed on the outgoing track B for delivery to the supply car.





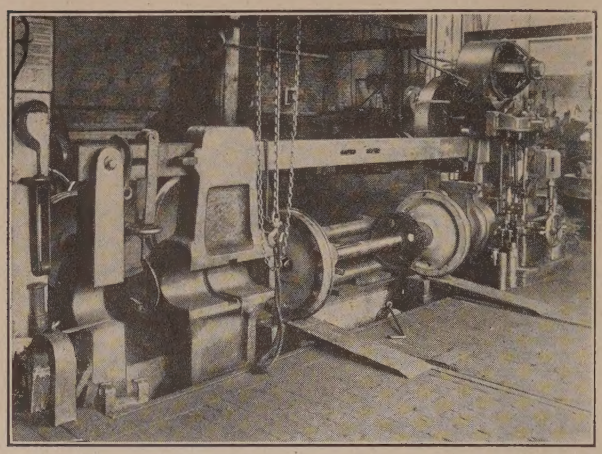
Wheels which have reached their limit of wear are delivered by the car to track B, from which they are rolled to the wheel press, where they are removed. New wheels are taken from storage directly under the electric derrick and are installed. The electric derrick also serves the boring mill, to which new wheels are taken in quantities of twenty. Here they are bored to their respective dimensions and then laid aside for mounting. Axle work is done by the machines at the left in the upper illustration.

Speedy Routing a Feature of Third Avenue Shops—The wheel and axle department of the Third Avenue Railways, New York, shown in the plan at the left, presents an orderly and compact arrangement. Wheels and axles are received either from cars which run into the shop on the balcony, or from the truck overhauling shop, adjacent to the wheel and axle department. Both of these, together with other departments, are served by a large overhead traveling crane, which delivers the incoming material to the particular track or location designated for receiving it. After inspection the units are routed in three ways: First to the wheel press for dismounting, if any part is to be scrapped, or should an axle need to be turned or straightened; second to the grinder, for cast-iron wheels, and, third, to the lathe for turning steel wheels.

Wheels and axles are finished in the boring mills and axle lathes and then stored in their particular section. They are handled from these storage points to the wheel press by means of a large jib crane. After the units have been assembled they are routed either direct to the wheel lathe or grinder, if work by these tools is required, or to the outgoing tracks for inspection.

The wheel press is served from the floor by the transfer table and by a 1-ton air hoist mounted on a 10-ft. jib crane. The wheel lathe is served by a 1-ton electric hoist, mounted on a 22-ft. radial roller crane. The wheel grinder is served by a 1-ton air hoist mounted on a 10-ft. jib crane, and a 20-ft. jib crane equipped with a 1-ton chain hoist takes care of the axle lathe and the boring mills.

Equipment for Wheel Repair in Shop at Tacoma, Wash.—Wheel and axle work for the Puget Sound Electric Railway, the Tacoma Railway & Power Company and the Pacific Traction Company is taken care of at the Tacoma shops, shown above. A large wheel storage space is provided adjacent to the general machine shop. This has four rails on the track in order to increase the storage capacity and is served by an overhead traveling telpher. Wheels and axles that require machining are delivered on the track in the general machine shop. Where wheels are to be scrapped or axles turned or straightened, these are delivered to the hydraulic press. Wheels that require re-turning are routed to the wheel lathe. New wheels are bored out in the boring mill and axles are turned in a 36-in. lathe. All these machines are served by jib cranes, and in addition a differential chain block on an air-operated monorail overhead hoist runs the length of the shop over the track. The welding room forms one corner of the shop and flanges are built up where warranted.



Motor-Driven 250-Ton Hydraulic Wheel Press in Chelsea Shops of the Eastern Massachusetts Street Railway

This press is equipped with triple pumps and has hydraulograph attachment.

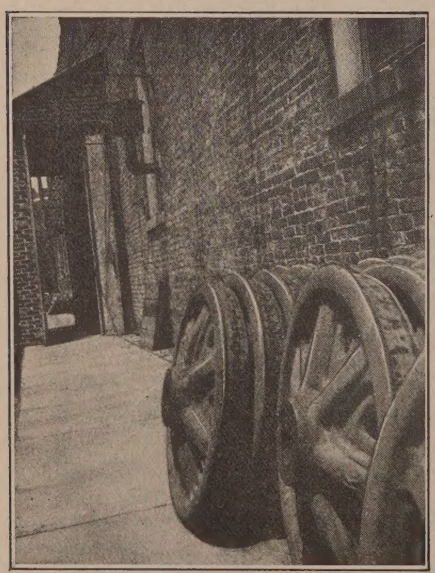
off the storage platform from a car run alongside. The center part of the platform is taken up by a bay projecting out from the shop. Folding metal-covered doors are provided at each side of the projection. An overhead hoist travels the entire length of the platform and the overhead track on which it runs extends through the shop projection. With this layout wheels can be picked up by the hoist and handled into the shop and placed right at the machines. Scrap wheels are taken out and placed in position for loading in the same manner. This system involves but one handling in either case. New and scrap wheels are kept separate by using one end of the platform for new material and the opposite end for scrap. Accompanying illustrations show the platform and the interior arrangement of the shop, with wheel press and 42-in. boring mill located right at the projecting bay. Several other railways have found a great advantage in having storage space for rough material in the immediate vicinity of the tools on which the work is done, rather than in a general storeroom.

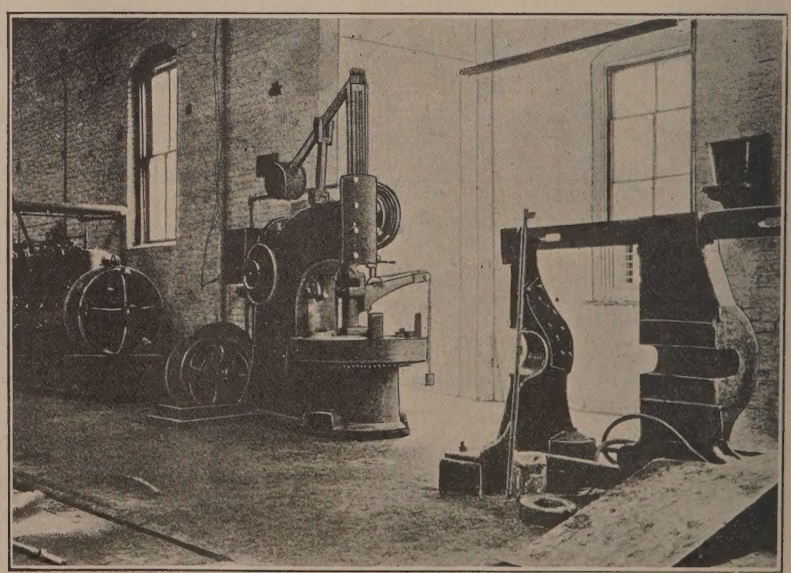
The storage of wheels, after they are mounted on axles, usually is taken care of in a space with tracks and the wheels are placed on the tracks. In order to economize on space several railways have provided this storage with gauntlet tracks, one rail being placed between the rails of the adjacent track. Wheels when stored are then staggered so as to fit inside those on either side. This arrangement is of particular advantage where mounted wheels are stored inside the shop adjacent to the wheel and axle department. It has been successful in the Sixty-fifth Street shops of the Third Avenue Railway, New York City, and in the Tacoma shops of the Puget Sound Electric Railway.

A number of layouts of the wheel and axle departments for different railways are shown in accompanying illustrations, and where a particular routing is followed for the work this is given. In most smaller railway shops, however, very little attention is given to routing the work to the different machines. Of course it is not such an important factor here because wheels and axles are taken out of trucks for some special attention and they go directly to the machine where the work is to be performed and when finished are often either returned to the same trucks or taken to storage. On the larger railway properties more attention has been given to the location of the various machines so that the work can be handled from one operation to the next without interference and with the least labor.

SHOP REARRANGEMENT INCREASED OUTPUT 50 PER CENT

An accompanying illustration shows the recently rearranged wheel and axle department of the Third Avenue Railway, New York City. Particular attention was given to routing the wheels and axles and an orderly and compact arrangement resulted. Incoming and outgoing material are kept entirely separate. As a result of the rearrangement, production of pairs of wheels necessary for delivery to the truck overhauling shop and to the various carhouses was increased 50 per cent and at the same time the cost per pair of wheels handled was reduced 20 per cent. By providing ample labor saving devices for handling, not only were costs reduced and production increased, but inspection of the





Left—Wheel Storage Platform at the Chattanooga Shops of the Tennessee Electric Power Company. Right—Extension of Shop Over Platform Facilitates Bringing Wheels Into the Shops for Machining

finished material is made in a more thorough and orderly manner. This is of particular advantage in this shop, due to the piece work system employed.

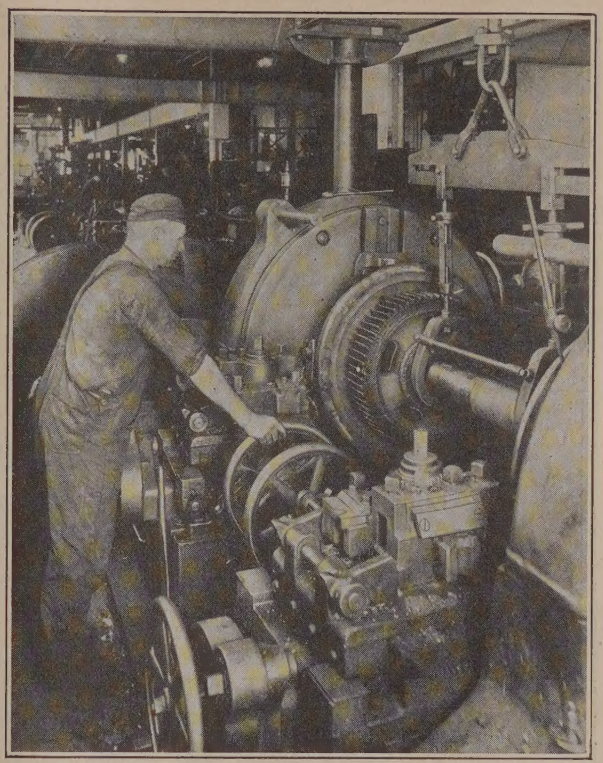
OLD TOOLS CAN BE PARTLY MODERNIZED

Along with the rearrangement of machine tools, two railways report changes in the machines themselves in order to provide for increased duty. In Brooklyn two wheel lathes had their 15-hp. motors replaced by motors of 40-hp. capacity. New spool castings with heavier face plates, new drivers and pneumatic tool clamps were also installed. The rugged construction of the lathes made it possible to take advantage of high-speed operation so that the output of each machine was increased 100 per cent.

A 36-in. wheel lathe in the Sixty-fifth Street shops of the Third Avenue Railway was provided with two new tool posts. Additional parts for the old ones were also purchased so that these are held in reserve. A double wheel grinding machine was overhauled and the driving rigging was improved. A new exhaust system was also installed.

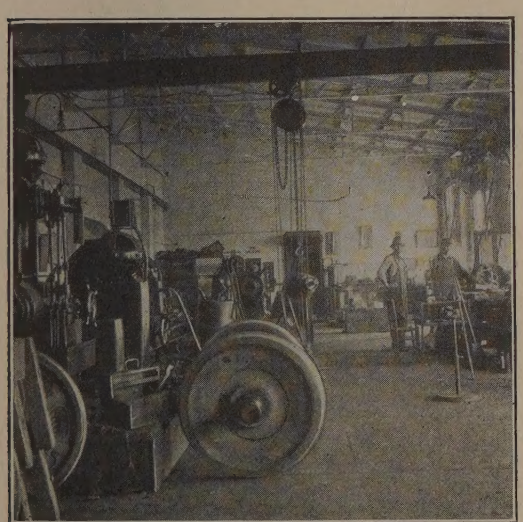
Several railways have increased the efficiency of wheel and axle departments by installing new machines and replacing hand-operated chain hoists by a motor or pneumatically operated type. Several of the new type boring mills used by electric railways are equipped with air hoists integral with the machine and with provision for several tools on the tool spindle. The various cuts necessary in finishing a wheel can thus be made without changing the position of the wheel on the bed. This convenience together with better facilities for handling has enabled a 34-in. wheel to be bored in fifteen minutes, whereas with older equipment seven pairs in an eight-hour day was the limit.

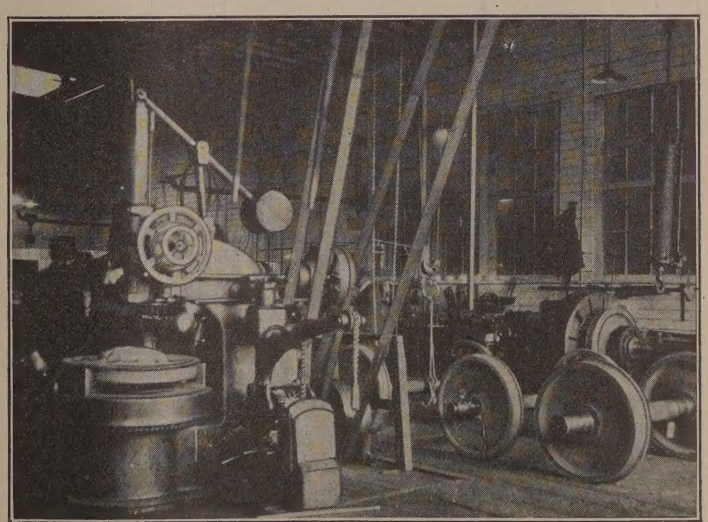
A late type of wheel press is used in the Thirty-sixth Street inspection and overhauling shop of the Brooklyn-Manhattan Transit Corporation and in the Morris Park shops of the Long Island Railroad. These have provision for four tools in each of the two turret toolposts. The tools used are a roughing tool for the wheel tread, a flange roughing tool, a combined tread and flange finishing tool and a chamfering tool. This is a 42-in. lathe on which a $\frac{3}{8}$-in. cut can be made at high speed. An average of two pairs of wheels per hour is being turned out in the Thirty-sixth Street shops. Through the use of the efficient clamping arrangement provided, wheels can be removed and new ones put in place for turning in two minutes. One man and a helper are used in operating this wheel lathe, and they are turning out as much work as was previously done by nine men and several older type machines.



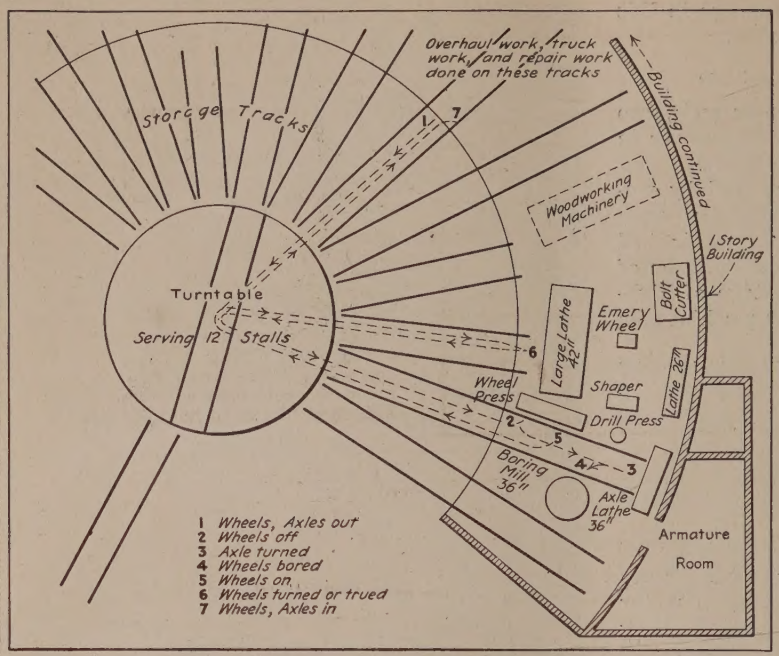
Wheel Lathe in Boston Elevated Railway Shop

This lathe has repeatedly turned a pair of steel wheels in fifteen minutes. It is driven by a 50-hp. motor and has two tool posts, both wheels of a pair being turned simultaneously. The tailstock is driven by a 6-hp. motor and an air hoist above the lathe handles the work. The lathe has a 42-in. swing.





Left—Huntington, W. Va., Shop of the Consolidated Power & Light Company, with Overhead Traveling Crane to Serve the Wheel and Axle Department. Right—Boring a Wheel in the Tacoma Shops of the Puget Sound Electric Railway. A Portion of the Wheel Lathe Is Seen in the Background at the Right



Work at Shops of Waterloo, Cedar Falls & Northern Railway

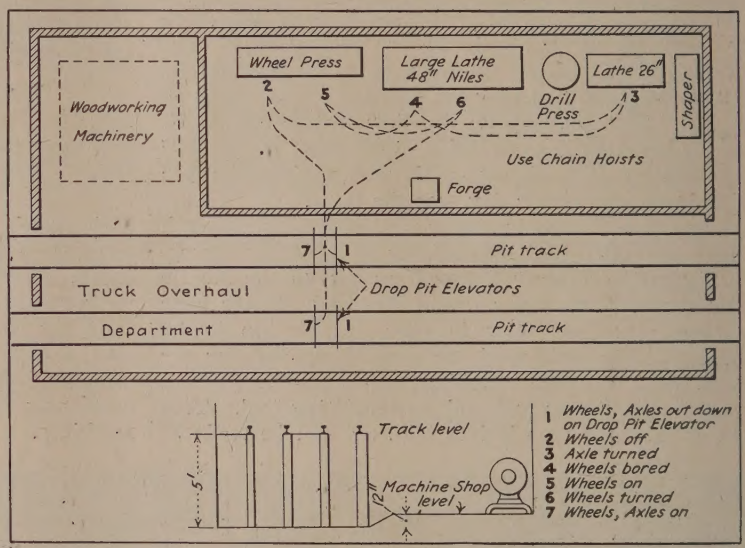
A round house serves as a shop for the Waterloo, Cedar Falls & Northern Railway. Wheels and axles are removed from trucks on the tracks used for truck overhauling work. An electric crane mounted on a small car transports the wheels and axles from the dismounting track to the turntable and then to the machine on which the repair work is to be done. The shop is equipped with two axle lathes.

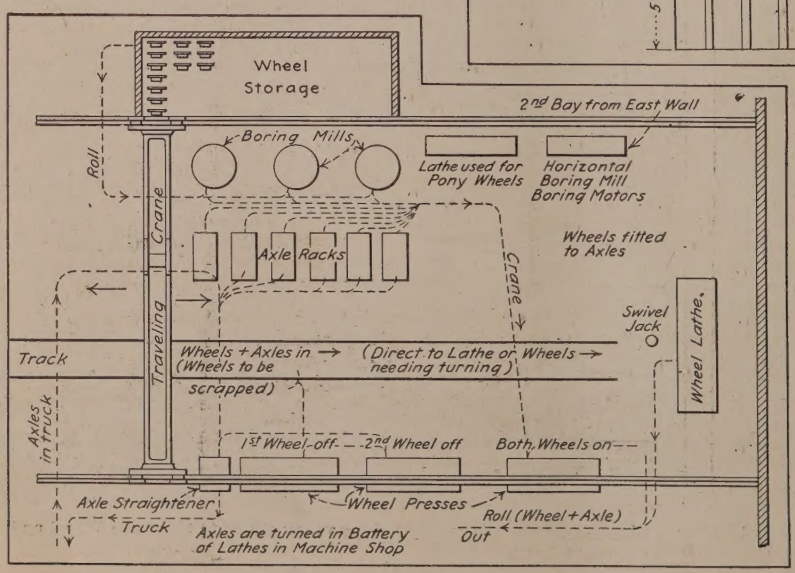
The track serving the 36-in. axle lathe also serves the 36-in. boring mill and wheel press, so that the wheels requiring removal are brought in on this track to the wheel press, and if the flanges and treads require turning they are handled on the adjacent track direct from the crane car to the wheel lathe.

New wheels can be brought in on a track adjacent to the boring mill and after being bored can be stored alongside. When they are required for mounting, they are handled from this position to the wheel press.

Shop of the Iowa Railway & Light Company, Cedar Rapids, Iowa

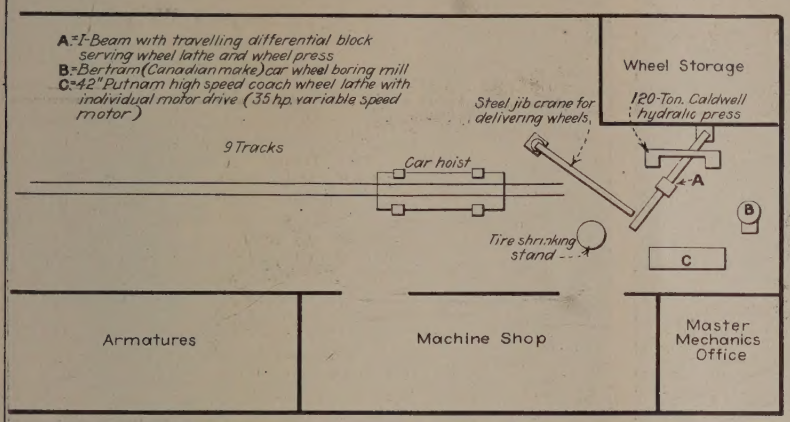
The floor level of the wheel and axle department in this shop is approximately 4 ft. below that of the pit track. Drop pit elevators are used for removing the wheels and axles from cars, and they are thus delivered to the wheel and axle department. Where wheels require renewing they first go to the wheel press and the axle then is delivered, if re-turning is necessary, to a 26-in. lathe by means of a chain hoist. After turning, it is again delivered to the wheel press. Wheels are turned in a 48-in. lathe, and after drilling to proper size are also delivered to the wheel press for mounting. The location of the wheel and axle department adjacent to the truck overhauling department is found particularly convenient.





West Shops of Chicago Surface Lines

A track leads direct to the wheel lathe for turning wheels with sharp flanges. Where wheels are worn to the limit, they are handled from this track to the wheel presses. Three wheel presses mounted in a row are used as indicated for wheel removal and mounting, and an axle straightener is conveniently located at one end. On new work, wheels are taken from the wheel storage and rolled to three boring mills. Wheels are thus bored out to fit the various axles on which they are to be pressed and are then handled by cranes to the wheel press used for installing wheels. Axles are turned in a battery of lathes in the machine shop, adjacent to the wheel and axle department.

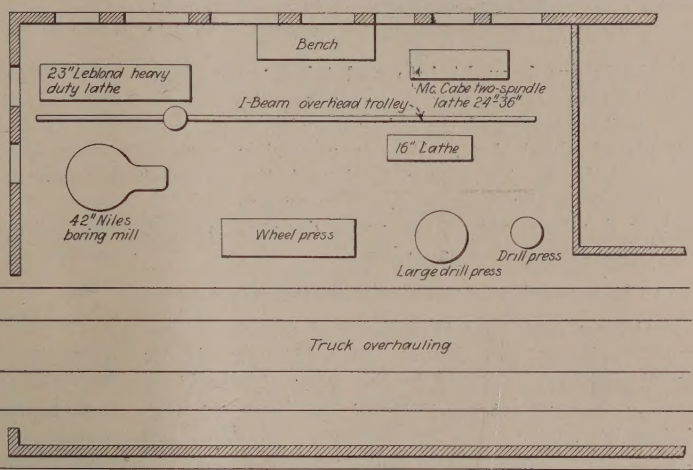

A=I-Beam with travelling differential block serving wheel lathe and wheel press
B=Bertram (Canadian make) car wheel boring mill
C=42" Putnam high speed coach wheel lathe with individual motor drive (35 hp. variable speed motor)
Wheel Storage
120-Ton. Caldwell hydraulic press
Steel jib crane for delivering wheels
9 Tracks
Car hoist
A
B
Tire shrinking stand
C
Armatures
Machine Shop
Master Mechanics Office

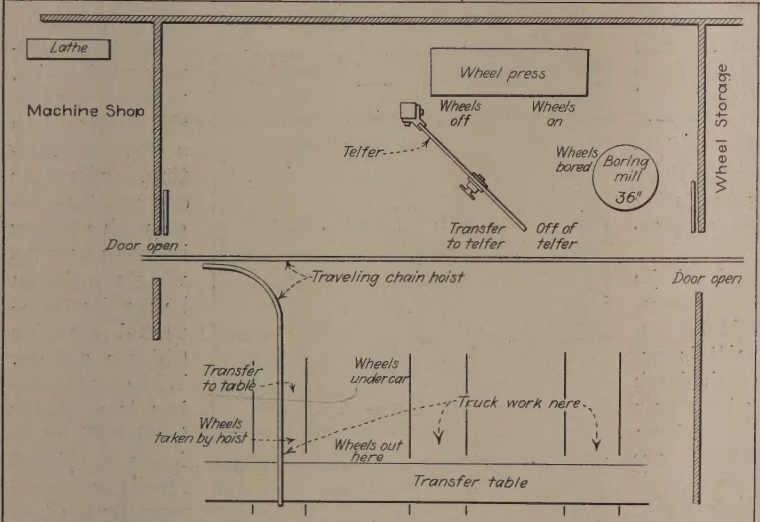
Wheel and Axle Equipment of the British Columbia Electric Railway

Wheel work in Vancouver, B. C., is done in a section just to the rear of the overhauling shop. A high-speed wheel lathe, 120-ton hydraulic press, wheel boring mill and tire-shrinking stand form the equipment. These are served by two jib cranes. Wheel storage is provided just back of the wheel press, and axle work is done in the machine shop, adjacent to the wheel department. Tires are also bored on a boring mill in the machine shop. The tire-shrinking stand has a concrete base with central hole and steel blocks to hold the wheels.

Wheel and Axle Department Adjacent to Truck Overhauling Track in Knoxville

Wheels requiring removal can be handled directly from the overhauling tracks to the wheel press in the shop of the Knoxville Power & Light Company. A 23-in. heavy duty lathe located in the corner is used for turning steel wheels, but as both cast iron and steel wheels are used on the system, this machine is required infrequently for this work, but it is also used for turning axles. A 42-in. boring mill with a five-jaw universal chuck is used for boring out wheels and gears. Two other lathes, one 16 in., the other double-spindle motor driven, are used. An I-beam overhead traveler serves this department. The shop floor is made of wood blocks.



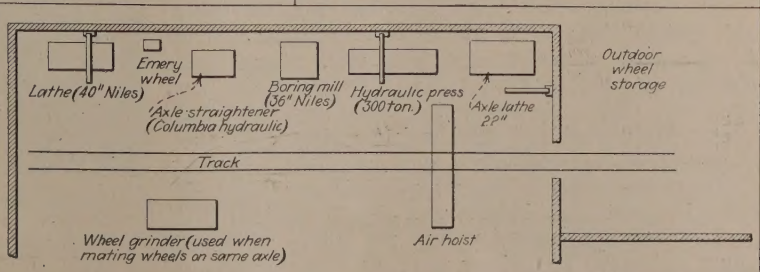


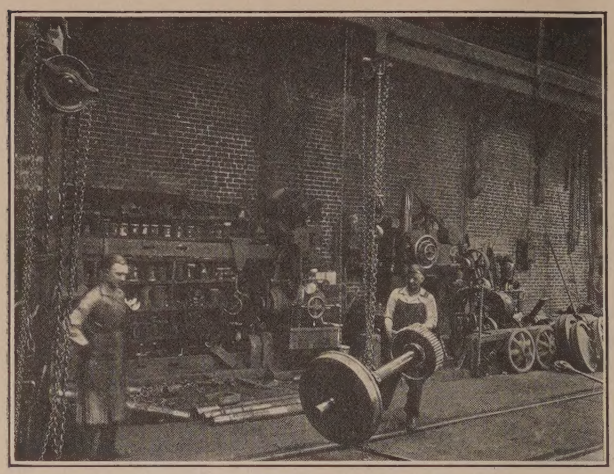
Wheel and Axle Practice of the Tri-City Railway, Rock Island, Ill.

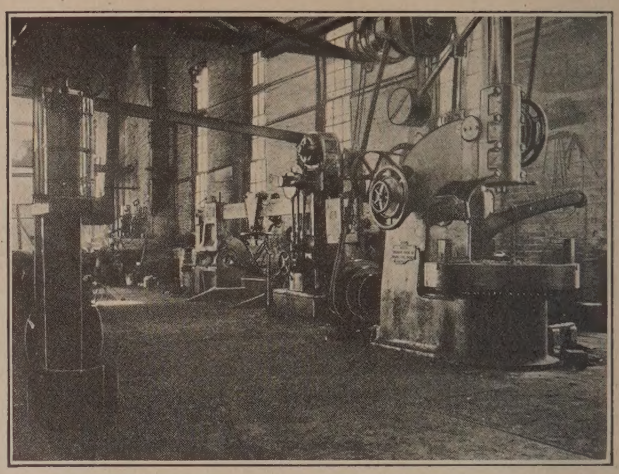
No provision is made for grinding or turning wheels in the wheel and axle department of the Tri-City Railway at its Rock Island shop, as interurban steel wheels are sent out for turning and wheel-truing brake shoes are used for grinding cast wheels. The wheel and axle department is at the rear of the truck overhauling tracks. After removal, wheels are placed on the transfer table and from this are picked up by a traveling chain hoist. This overhead traveler serves the wheel and axle department and the machine shop. Axle work is done in a lathe in the machine shop. Wheel storage is provided at the side of the shop adjacent to the wheel and axle department, and a door opening is provided so that wheels can be handled from storage by the overhead traveler.

Portland Railway, Light & Power Company

The wheel department of this company in Portland, Ore., has a concrete floor and is traversed by one track. Wheels come in from the various divisions on flat cars and are unloaded by an overhead air hoist. They are rolled about the floor by hand, and the various machines have jib cranes. Outdoor wheel storage is provided at the entrance.







Left—Handling an Axle After One Wheel Had Been Removed in the Shops of the Terre Haute Traction & Light Company. Right—A 42-In. Boring Mill with Hoist Attachment Is Used for Wheels in the Shop of the Indianapolis Street Railway

The wheels are brought into and taken away from the wheel press on two tracks, one above the other—one on the floor level and the other elevated above this a distance of about 4 ft. Wheels requiring turning are brought in on the upper level and the finished wheels go out on the floor level. This arrangement is convenient for locations where space does not permit having two tracks on the same level.

GREAT VARIATION IN COSTS OF TURNING WHEELS

In analyzing costs for turning steel wheels a considerable variation was found. This is explained by the great difference allowed in the wear of wheels on different properties by the varying facilities for handling, and whether or not the machine tools used are modern or out of date. Some roads remove wheels for turning at quite frequent intervals and do not allow flanges to become very sharp, while others allow a large amount of flange wear. Some high-speed interurban railways feel they would be taking a chance of having accidents if flanges were allowed to become sharp. Some others find flanges wear more rapidly after they are partly worn and while continuing them in service watch them very carefully during the latter period of use. When the flange wear appears excessive the wheels are removed and turned.

The amount of metal which must be turned off the tread, of course, depends on the condition of the flange, varying from $\frac{1}{8}$ in. to $\frac{5}{8}$ in. Very few roads keep a record of the amount of metal turned off, so it is impossible to give a comparison of costs per inch depth of tread metal removed. Costs reported for turning a pair of steel wheels range from 35 cents to $2, with an average of about $1.25. Several large railways are obtaining excellent results from the piece-work plan of payment for wheel turning. The Interborough Rapid Transit Company, New York City, has used the piece work system since 1912, and some interesting figures of the results obtained in turning steel wheels were published in the ELECTRIC RAILWAY JORURNAL for March 17, 1923. By using the latest improved machinery, high-speed tool steel and the piece-work plan the output in this company's shop has been increased to twenty-five pairs of wheels per day per man. It should be mentioned, however, in this connection that the Interborough company does not allow its wheel flanges to become excessively worn, so that the amount of tread metal removed per turning is less than that for most electric railways.

Tool grinding machines are also very important adjuncts to a wheel and axle department. In most railway shops grinders are located either in or close to the tool room. In comparing the amount of work turned out by similar machine tools, the importance of close attention to cutting tools was very apparent.

Tower Wagon in Shanghai, China

COOLIE labor is very cheap in Shanghai, China, and as a result it is used as the motive power for various maintenance of way and line vehicles. The accompanying illustration shows a trolley inspection and repair wagon in position for making repairs. Without pressure on the handle a support is in contact with the roadway and this, together with the wheels, gives a firm foundation. By pushing down on the handles the tower balances over the wheels and can be readily transported by the Chinese coolie. While coolie labor is used for truck vehicles, it is quite evident from the accompanying illustration that automobiles are quite generously used for passenger riding. The trolley lines are also reported as being very liberally patronized by the Chinese residents of Shanghai, who are very fond of riding on the street cars and other conveyances.

Making Overhead Repairs in China

Putting Overhaul on a Production Basis

Many Methods Developed by Manufacturers Can Be Applied to the Railway Repair Shop—Scheduling All Work Can Be Done and Non-Productive Time Cut Down—Labor-Saving Devices Are Advantageous

*By Henry S. Day**
Railway Department Westinghouse Electric & Manufacturing Company

ALL successful manufacturing plants turn out their product on very definite schedules built up for the necessary processes and operations required to turn the raw material into a finished product. The one aim sought is to keep the workers continuously performing their allotted tasks without interruption caused by shortage of raw materials, non-progressive movement of work in process and shutdowns of machines due to plant failures.

To accomplish this a manufacturing program is planned months ahead of time. The first thing done is to obtain the raw material. Careful studies are made of the various machine tools needed in the process, and the capacity is figured to get daily output of each machine. Each lot of parts, then, is routed and timed to progress without blocking other lots, or keeping machine tools idle waiting for work, or overloading them, thereby keeping operatives idle waiting for parts.

Planning to Cut Down Non-Productive Time

Two of the greatest difficulties are to cut down non-productive hours and time required to handle or move material, either raw or in process of manufacture. Unless this planning is incorporated, serious losses will result. For many years little thought was given either to this feature or to the arrangement of buildings, machinery or facilities; but at present a new manufacturing plant has incorporated in the initial plans all of the physical arrangements that will make possible concentration of departments, progressive movement of raw materials, and work in process. Even the make-up of the organization that will operate it is provided for.

While this has been true in the case of leading manufacturers, it has not been applied to the same extent by the electric railways in the big shops they must operate to maintain their rolling stock. These shops employ large forces of men and use great amounts of material. While the operations do not duplicate those in a manufacturing establishment, unquestionably many of the money-saving methods and facilities of the latter can be applied to the car repair shop.

A schedule in the electric repair shop reduces to concrete values the work to be done, and makes possible the planning that bridges over the time between purchase of the materials and when the car actually enters the shop for overhaul.

The first and greatest problem in succesfully overhauling cars is to carry in stock at all times the right kind and quality of materials and supplies to meet the production schedule of a definite number of cars overhauled per day, and to make it possible to order in a car on a predetermined date and turn it out exactly on another predetermined date. The effectiveness of any production schedule is lost if this is not done, and it cannot be done unless material is available.

Co-operation between the shop and the stores department must exist to the highest extent. Unless the purchasing agent and storekeeper are working months in advance of shop schedules they cannot be expected to supply the demands. Cars running long over the shopping time planned not only demoralize the shop schedule, but hold rolling stock out of revenue service. A definite schedule, closely followed, also supplies the only means whereby the master mechanic can aid constructively the storekeeper in properly ordering stores.

In speaking of a production schedule, it is not sufficient to figure how many cars will have to be overhauled each year from the number owned and the total miles operated. It is very simple, for instance, to figure that for a road operating 1,000 cars averaging 3,000 miles per month, an overhauling period of 50,000 miles will require each car to be shopped approximately every 16⅔ months; and that to do this, working 300 days per year, it would be necessary to put through the shop 2.4 cars per day. This is but the beginning. Besides the regular overhaul a certain number of wrecked cars have to be expected, and there are a good many heavy repair jobs on bodies and trucks, besides a certain number of motor and wheel changes. The number per year of the latter cannot be figured accurately, but averages can be approximated and made a closely adjusted part of the shop program.

Using the number of cars that must be overhauled per day, with the wrecks and other repair jobs arranged and classified as a daily output, it is necessary to work back into each department of the shop and figure out the number of repair jobs or amount of daily production that the department can turn out. Sufficient parts are needed to supply the demands of the cars scheduled out. The individual departments have, further, to be enough in advance of the cars due out to allow time for installation of the parts on the car.

To keep these departments working with a minimum of men and well-balanced production—that is, not overloaded one week and slack the next—a fair amount of extra or spare parts and apparatus is needed for a working surplus. To allow a department to become slack and temporarily to transfer men to some other department is inefficient and accomplishes little. With a properly figured out schedule there should not be any departments that could transfer men.

Repair Work Is Made Up of Repetitions

Overhauling consists of dismantling, repairing, and replacing worn parts with new parts ready manufactured, and assembling. It cannot be placed on the basis of a manufacturing plant turning out a given product in which a given number of operations are merely repetitions. Yet with a comparatively few exceptions, operations in a repair shop are also repetitions. The difficulty of grouping these lies in changing from one job to another, but by building the schedule on the process

*Formerly superintendent of equipment Kansas City Railways.

required a very accurate shop program can be arranged. Such a schedule will place each department on a given performance and will indicate quickly what hours are productive and what are non-productive.

One of the principal factors in the balanced production of a department is the delivery of parts for repair and the necessary material and the routing of the repaired parts. Concentration and proper group arrangement will cut down very quickly the rehandling and lost time. The arrangement of the shop buildings frequently is responsible for double handling and back track moves. Even in existing shop buildings, a great deal can be done to reduce expensive movements.

A Small Labor Gang Can Handle Transport of Parts

It would seem better to keep the foreman and the men at the department location, and have all material movement under the control of one man with a small labor gang, using electric trucks and cranes to supply the wants of all departments on a regular schedule, than to have work interrupted while workmen, or even worse, foremen, fetch and carry.

To illustrate this point a car is placed on an overhaul pit, where it is raised by mechanical means and blocked in place. Trucks will be run out from under on their own power, and removed to truck overhaul pits by electric crane. Parts and apparatus will be moved to the various departments either by electric crane or electric trucks, and all repaired parts and apparatus returned in the same manner.

The entire material movement will be carried on under the supervision of one man. It is this man's business to see that the material movement is carried out without interference and that operations on the car body move steadily and without delays. During the process of overhauling the truck, for instance, the foreman of the truck department will issue storeroom requisitions for renewal parts, which he will turn over to the man in charge of material movement; and the material will be returned from the storeroom and delivered to the truck department by electric truck.

This system can be applied to a force of surprisingly small size. The returns in reduced labor costs and elimination of lost time waiting for materials will pay for the investment in trucks, etc., many times over. The effectiveness of a shop schedule can be much hampered by material movement. Replacing manual labor by quick-moving machinery will produce sure results.

Foremen and Inspectors Must Know Their Jobs

In stripping down and building up a truck the man who supervises the job and the men who accomplish the work must know how to turn out a truck with all parts having the same clearances, bearing surfaces, alignments, and standards as were set by the builder. The man who makes the final inspection must know whether the work has been done right. This applies to all parts of the equipment in the same way that it does to a truck, and the necessary precision with which the work is carried out depends entirely on the way the equipment is designed and built. In order to obtain results that will permit the equipment to perform the work it was designed to do, it must, after an overhaul, be reassembled just as accurately as when it was first built. There must be an exact adherence to adjustments, fits and quality of the parts replaced. A liberal use of accurate gages, thorough and intelligent inspection, careful testing, preceded by a thorough practical knowledge of results required, are needed in the individual operations just as much as schedules and system are needed to control production.

It follows that if a repair shop should be placed on a production schedule with the chief product an overhauled car, the organization and its control should be made up on the same basis, the supervisory force consisting of specialists with ample supervision.

No small factor in the efficiency of a shop is a plentiful supply of well-designed, high-grade, small hand tools and labor-saving facilities. A repair shop without them will waste time, because repair work necessitates frequent changes from one class of job to another and trucks, motors, and auxiliary apparatus are dirty, rusted, and greasy, consequently hard to take apart.

A good share of the work has to be carried on in a manner that makes it impracticable to use machine tools, and hand labor predominates, but it can be speeded up with high-grade power tools. Electrically-operated cranes and hoists, electric lift trucks, and devices of this nature, will always warrant the initial cost in time saved. Much time is lost removing grease and dirt in preparing parts for assembly and machine operations, and well-designed devices to replace hand labor will help costs materially. A lye vat large enough to take a complete truck frame is one of the best of these.

Plenty of light scientifically distributed, air, gas, electric current and water carried to every point where they have a possible use, with numerous outlets arranged to cut down waiting time and steps, are necessities and at the same time economical.

Order and System Are Essentials

An editorial in the ELECTRIC RAILWAY JOURNAL of May 19, 1923, entitled "Orderliness and System in the Truck Shop" stated: "The general impression that one carries away from visits to most of these [shops] is one of disorder," and also, "Without doubt one of the least expensive improvements that can be made, and still one that will produce important results, is that of systematizing the work and maintaining an orderly truck shop." Frequently this can be applied not only to the place where trucks are being overhauled, but also to the entire shop. This results in a daily loss, because workmen feel the effect of disorder and dirt to the detriment of their performance.

The fact that aisles are blocked, or are not provided, parts are scattered, and floors are dirty and greasy, causes no small loss of time. It takes longer to move from one point to another on a crooked path than on a straight one, and longer to find parts if they are scattered than if they are placed for use following a thought-out plan to save time and movements. Much can be done with this idea alone. Good workmen do not live in dirt and disorder at home, and they do not like to work in it. Such conditions are pretty sure to cause the workman to slow down and to become careless of his time and the company's property. Temporarily discarded parts or half-finished jobs allowed to lie around on floors and under benches day after day will have the effect of making him more or less indifferent, because he rather logically figures out that if the management can afford to allow parts that are clearly of value to kick around with apparently little thought as to their ultimate use it is no affair of his. He also is very likely to treat as inconsistent constant cautions to practice economy and prevent waste.

There is nothing that will kill the interest and efficiency of good workmen so quickly as to allow plant equipment to run down and get out of repair. It is no more consistent to expect a shop force as a whole to produce good results with a plant in which tools and equipment are generally in need of repair than it is to expect an individual workman to unbolt a suspension bar with a worn-out wrench.

Many old shops can, without the outlay of a great deal of money, have their operating costs reduced and their production increased by adopting some of the methods, systems, and facilities already developed by out-and-out manufacturing concerns, who would not even consider repair work. On the other hand, many repair shops are engaged in more or less comprehensive programs of manufacturing renewal parts, with the idea that economies are being effected, while everything about their organization and plant would indicate that this feature of their operation is hopeless competition, and that they have been drawn into it either through the difficulty of obtaining renewal parts from the manufacturers or because they do not know their actual costs.

To quote again the ELECTRIC RAILWAY JOURNAL of May 19, the editorial headed "Good Savings by Improvements in the Old Shop" states that "Many operating officials consider the shops a necessary expense and look with little sympathy on any proposal to put more money into these facilities," which is not only true but states the case rather mildly.

There are real opportunities for economies in the mechanical departments of electric railway properties. The shops offer fertile ground, and the head operating official will find it profitable to give this department of his road closer scrutiny.

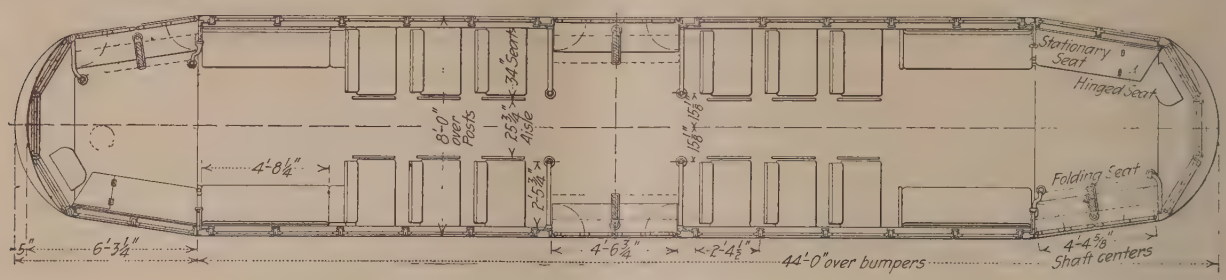
Double-End Pay-as-You-Pass Car Introduced in Brooklyn

Two Hundred Cars, Just Being Placed in Service, Are Arranged for Front Entrance and Center Exit — Novel Scheme of Exterior Painting Attracts Attention—Variable Load Brakes and Electro-Pneumatic Door Control Are Used

A NOVELTY in merchandising transportation is being used by the Brooklyn City Railroad as a means of introducing its new front-entrance, center-exit cars. Between the belt rail and the bumpers the dash is painted peacock blue, and from the headlight as a center there extends a striking spider web of yellow and red, as shown in an accompanying illustration. The purpose of this unusual color scheme is to draw the attention of the public to the new cars. Posters in every car operated by the Brooklyn City Railroad will explain a couple of days in advance about the introduction of the new type cars, and when they actually appear on the street arrayed in these brilliant colors they will stand out conspicuously in contrast to all other cars in the city. The public will therefore more readily grasp the fact that the Brooklyn City Railroad has put 200 new cars into operation. At the same time this color scheme has a practical value in that it will inform prospective passengers when the approaching car is of the front-entrance type. This is important because there are no other front-entrance cars in Brooklyn, except the safety cars.

First deliveries of these cars are now being made and it is expected that they will be placed in service early in November. The cars are of the double-end type with front entrance and center exit, designed primarily for two-man operation in heavy city service, although they are so equipped that they can be operated by one man, if it is desired. When the car is operated by two men, the conductor stands in the middle of the car, near the

The First of 200 New Double-End, Front-Entrance, Center-Exit Cars of the Brooklyn City Railroad



By Using All Available Space a Seating Capacity of Fifty-three Has Been Secured

center exit, and the passenger pays his fare as he passes on his way to the exit or on his way to the rear half of the car. This arrangement has been adopted with the idea of speeding up passenger movements.

Features of Underframe Design

Clearance is always a serious problem in the design of a street car for service in Brooklyn. The location of pillars of the elevated railway structure, especially the location of columns at the ends of the Brooklyn and Williamsburg Bridges, is such as rigidly to limit the length and width of surface cars. Small clearances exist also on several other city-owned bridges. Inasmuch as the new cars are designed for heavy city service, it was desired to have them of maximum size, and it is claimed that not a single inch could be added to the over-all dimensions of this car without causing trouble where the clearance is small. The length is 44 ft. over bumpers, with truck centers 21 ft. 6 in. The width over all is 8 ft. 3 in. Each platform is 6 ft. 3¼ in. long. By tapering the platform from its maximum width at the bulkhead to a width of only 6 ft. 8 in. at the vestibule corner posts it has been possible to design a car of this size without exceeding the clearance limit.

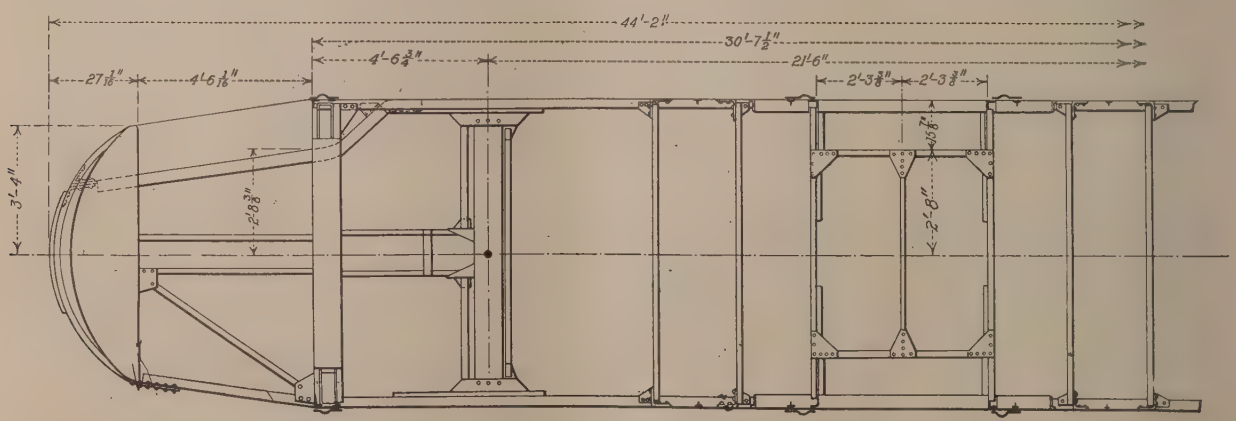
In order to keep within the desired dimensions the front step is built into the platform, forming a well into which the doors fold and eliminating any outside folding step. This has necessitated the design of an unusual platform knee on the near side of the car. The knee bends inward toward the center line of the body from a point slightly inside the bulkhead and passes behind the step well, as shown in the accompanying drawing of the underframe.

The steps for the center-exit doors are similarly within the lines of the car body. A well has been made on each side 16 in. wide and 4 ft. 6¾ in. long. The center cross sill is shortened and framed with steel channels running lengthwise between the adjacent cross sills. On each side of the car two strap brackets attached to the cross sills on each side of the center support the exit step. Feralun is used for all step treads and edges of the floor.

To secure the maximum seating capacity in a car of this type, an unusual arrangement has been adopted. There are twelve transverse seats in the center of the body, six on each side of the center exit; two longitudinal seats at each end inside of the bulkhead and a permanent seat on the left side of each platform. A folding seat of special design is used to cover the door openings not in use. This is a collapsible seat hinged in the middle and the two halves may be folded together until they meet. The seat may then be slipped down into a pocket, the process somewhat resembling that of slipping a book backward into a bookcase. This arrangement eliminates any chance of the seat falling down while a passenger is sitting on it because it is entirely independent of any supporting legs or similar device. Each car is equipped with four such seats, one for each center door and one for each platform door. When the car is in service the seats on the near side are collapsed and slipped back into their pockets, forming divisions in the center of the entrance and exit passageway and insuring a double stream of passengers. The seats on the far side are unfolded and put into service.

Preference for Wood Seats

An interesting investigation was made by the company before deciding upon the material of the seats. Officials made trips at various hours of the day to different parts of the system and inquired of passengers on the cars what kind of seats they preferred. It was rather expected that some type of covered seat would



A Feature of the Underframe Design Is the Platform Knee on the Near Side Which Passes Behind the Step Well

find considerable favor. It was thought also that the passengers would be likely to express preference for the particular kind of seat used in the car in which they were riding at the time the question was asked. But neither of these things occurred. The officials say that the passengers favored wooden slat seats. Inasmuch as the company has found this type of seat to be desirable, not only on account of the economy of maintenance but also on account of sanitation, it was entirely ready to accept such a verdict from the riding public and all of the new cars have cherry slat seats.

Order Was Split Between Two Plants

Of the total number of cars being built, 100 are under construction at the Philadelphia plant of the J. G. Brill Company and 100 at the plant of the St. Louis Car Company. The cars built by the two different car builders are identical in construction. Duplicate prints of the same drawings were supplied to the car builders, covering all details of the car. Both lots have Brill 77-E-1 trucks with 26-in. rolled steel wheels.

Left—To Attract Attention the Dashes of the New Cars Are Painted Peacock Blue with a Red and Yellow Cobweb Effect in the Center. Right—The Entrance Doors Open Inward into a Well. On the Opposite Side of the Platform Is a Permanent Seat

Although the cars are of steel construction throughout, the weight has been kept down below 37,500 lb. The side sheeting is 0.25 per cent copper bearing steel. The use of copper bearing steel in place of the ordinary metal adds approximately 15 per cent to the cost of the sheeting, but it is thought that rust-resisting material will have a longer life that will more than repay the greater initial outlay. Climatic conditions in Brooklyn are particularly difficult on account of the nearness of the ocean and the fogs which carry minute particles of salt. This results in considerable corrosion of ordinary steel. The only wood used in the car interior is that in the floor, seats, doors and sash.

The vestibule posts and vestibule carlins are of wood in contrast to the steel posts and carlins used elsewhere in the car. This arrangement has been made, as shown in the accompanying illustration of a partly completed car, so that in case of collision the whole frame will not be injured. The hood not being integral with the car body, it can be easily and cheaply replaced after being damaged in an accident.

Of the cars 100 are equipped with four Westinghouse No. 510-A 35-hp. motors and the other 100 have General Electric No. 265 motors of the same capacity. The control is K-72-A for all of the cars. This controller differs only slightly from the well known K-35, but has two extra contacts at the bottom for use in connection with an electrically operated fare box. The control is interlocked with the line switch under the car. The motors are not interchangeable between the cars built at the different shops. Through the co-operation of the motor manufacturers, however, it has been possible to make the gears interchangeable between the two types of motors; that is to say, Westinghouse gears will work with General Electric motors, and vice versa.

Westinghouse variable load brakes are being used for the first time on surface cars in Greater New York. A spring-actuated valve controls the admission of air into the brake cylinder. The position of this valve is governed by a rod which extends from the variable load device to the truck bolster. A cam on the truck bolster is connected with the rod and on the truck transom below the cam is a knife-edge contact. The cam is not fixed rigidly to the truck bolster but is lowered into position only when air is admitted to the opening of the door engine. When the car is stopped and the door is opened this contact edge touches the cam. If the total weight of the car and its load varies as passengers board or alight the spring-actuated valve of the brake cylinder is reset in another position. By this means the amount of air admitted to the brake cylinder by the ordinary application of the brake handle is varied according to the weight of the car and its passenger load when the last stop was made. A braking efficiency of 100 per cent at all times is attained by this apparatus. The hand brakes on the new cars are of the Peacock staffless type.

Standard safety devices are installed on the new cars and electro-pneumatic control is used on the center

doors. These center doors are operated from the conductor's position by a push button. The door-operating mechanism is located above the doors, as shown in one of the accompanying illustrations, thus giving more floor space and insuring the apparatus against freezing in cold weather. The door-operating mechanism is manufactured by the Consolidated Car Heating Company. The front door is interlocked with and operated by the motorman's brake valve as usual with safety car equipment. All the doors are interlocked with a line switch to prevent the car starting before the doors are closed. A counter emf. relay is in circuit with the door control to prevent opening the doors when the car is traveling faster than a certain predetermined speed.

Fare Boxes Electrically Operated

Johnson type J electric registering coin boxes are used, together with International R11 registers, solenoid-operated. This apparatus is described elsewhere in this issue of ELECTRIC RAILWAY JOURNAL. When the car is in use with two men the fare box is located on a pedestal in the center of the car, but when it is being used as a one-man car the fare box will be moved to the motorman's end.

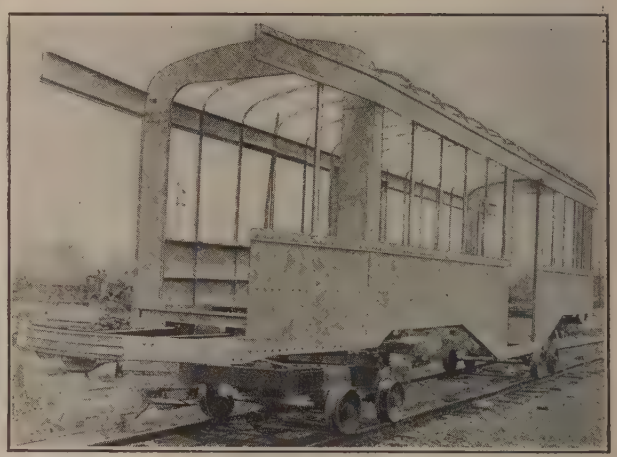
Mahogany finish is used for the interior woodwork and statuary bronze for the metallic trimmings. The cars are heated by Gold electric heaters controlled by Utility thermostatic heat regulators. The roof is of the arch type, equipped with twelve Utility honeycomb ventilators, and lined with white Agasote in one-half the cars and white Nevasplit in the other half.

Artificial illumination is supplied by two rows of small unshaded electric lights placed approximately over the center line of the cross seats. There has been in the past considerable trouble in Brooklyn from stealing of lamps and headlights. When designing the new car, therefore, particular attention was paid to this and a lock was selected which would prevent theft. General Electric lock sockets are used for the lamps. The lid of the headlight is of wire glass locked by a special eccentric key.

Hand straps are the same as used in the subway cars, porcelain enameled handles, Rico No. 5. Curtains are Pantasote. A new type of trolley catcher, which is described elsewhere in this issue, is used on the cars. It is similar to the ordinary type manufactured by the Ohio Brass Company, but has a novel lubricating device incorporated in its design.

An unusual feature of the arrangement of signs is that all of them are at the front end of the car. Hunter signs are used entirely. One is in the center of the letterboard above the middle front platform window, one is at the top of the near side platform window and a third is at the top of the first side window on the near side of the car. The other end of course duplicates this arrangement. The first and third of these signs indicate by name the route on which the car is running. Only the sign in the right hand platform window indicates the destination.

The general color scheme of the new car is the same as that which the Brooklyn City Railroad ordinarily uses, the base color being aurora red and the trimmings citron yellow. On account of the narrow streets in Brooklyn much trouble has been occasioned in the past by wagons scraping the paint on the sides of the cars.



Left—When the Car Is Operated by Two Men the Fare Box Rests on a Pedestal in the Center of the Aisle. Right—The Steel Work Does Not Include the Hood. This Is Built of Wood for Greater Ease of Replacement if Damaged in Collision

In order to avoid this each new car will be equipped with eight small guards. These are nothing more than vertical strips of pressed steel riveted at the four corners of the car body, and on both sides of each center door extending up to the belt rail. The strips project 1½ in. beyond the steel side sheets and it is expected that they will hold away any vehicle that may brush against the side of the car and prevent it from scratching the body paint.

New Car to Be on Display

The first car to be delivered will be placed on public exhibition Nov. 1 on a siding near the Brooklyn Borough Hall. Alongside of it there will be one of the old horse cars used many years ago. Placards will draw the public's attention to the fact that the old horse car cost about $650, whereas the new steel car cost approximately $15,500. In spite of the greater cost of the modern car the fare is now 5 cents instead of 8 cents, which the horse car charged, and the haul for a single fare is considerably longer. The public is invited to inspect this car and familiarize itself with its novel features before the company places it in regular service.

Crane Car Built for General Utility Work

A Work Car, Rebuilt Into a Crane Car, Has Provisions for Hoisting, Transporting Heavy Loads and Supplying Compressed Air—Also Used as a Snow Plow

FOR handling and transporting heavy railway parts a crane car is the best equipment available. The addition of a few special devices makes the car useful for many other purposes, so that it can be kept in almost continuous service the year round. Such a car proves a real labor and time saver.

A double-end crane car combining many novel and useful features has been reconstructed by the Lehigh Valley Transit Company, Allentown, Pa., from an old work car that had a limited application. The cab of the original car was located in the center, and the framing was comparatively light.

In the rebuilding of the car the center cab was removed and placed at one end as a stationary cab, while at the other end of the car a revolving steel cab was built to house the control mechanism for operating the car and for a jib crane. The underframing also was strengthened by the addition of steel members placed to provide for the additional strain incident to the work for which the crane car is suited.

The crane has an 18-ft. boom, constructed of 8-in. channels with a connecting steel lacing. The total reach from the pivot to the hoisting cable is 22 ft. The boom has steel jaw bearings resting against a 3-in. pin which is welded to the rotating base. The boom is raised or lowered by a hand windlass to adjust the height. This height seldom needs to be changed, as the rotation of the cab and the backward and forward movement of the car itself provide sufficient adjustment for nearly all classes of work. The boom can be removed easily, and a covered pocket is provided in the car floor, so that the crane car can be converted into a double-end work car on short notice, with the boom concealed and out of the way.

The revolving cab is built entirely of steel, and all the main members, the center frame and the sheet steel sides are electrically welded, bolts being dispensed with except where removable pieces are required or provision has to be made for the substitution of repair parts. The cab and the frame supporting the boom revolve around a heavy center pedestal which is supported entirely from a steel pivot cap.

At a distance of 1 in. above the rotating base of the cab a stationary false floor is attached to the central pedestal. On this stationary floor are located the operating mechanisms, comprising the controller, air-brake valve, hand brake, whistle, air gage, sander and gong. The wiring, air pipes and hand-brake chain go through the center of the pedestal, which is hollow. The headlight equipment, lightning arrester, circuit breaker and electric tail lights are attached to the outside of the rotating cab, receiving power through a contact ring located in the roof.

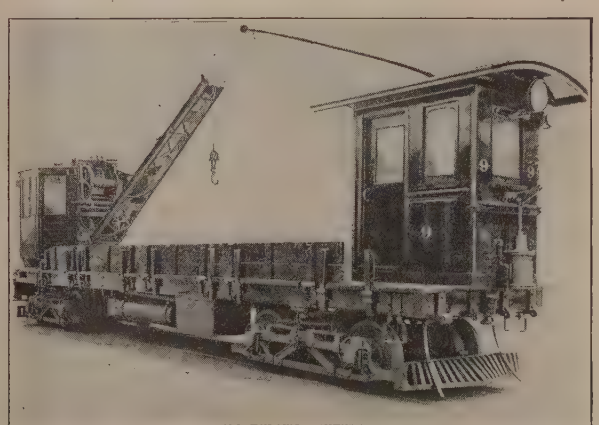
The hoisting cable travels over a pulley located at the end of the boom and another pulley at the top of the cab, whence it goes through the hollow central pedestal to a pulley located underneath the floor and thence by a double cable to an Ingersoll-Rand 4,000-lb. air hoist. Three speeds and capacities of the hoist are available. By attaching the hoisting cable direct to the double cable,

Provision Is Made for Use as a Snow Plow in Severe Storms

the 4,000-lb. lift is obtained at normal speed of operation. By placing the cable around a pulley at this point and attaching one end of the hoisting cable to a fixed hook located on the bolster, a 2,000-lb. lift at high speed is obtained. By passing the end of the cable through a sheave at the hoisting end, and attaching this to a hook located on the boom, an 8,000-lb. low-speed hoist is obtained. The normal lift of the cable is 19 ft., making it possible to attach the hook to a heavy article 40 ft. from the center of the pedestal.

Rotation of the hoist and cab is obtained through the use of a cable passing around a 4-in. channel ring which is located underneath the cab. The cable leads through pulleys underneath the car to a second Ingersoll-Rand 4,000-lb. air hoist. One end of the cable is attached to one drum of the hoist and the other to the opposite drum, being connected so that one cable is winding while the other is unwinding.

The air hoists used for operating the crane are of the type usually employed for shop use on carriers or booms, and are controlled by means of chain pulls. These controls have been removed, and electrically operated air valves, such as are used in the Type HL electro-pneumatic control, have been substituted. There are three stations from which the hoists may be operated to raise or lower and rotate the boom. One is on the pedestal in the rotating cab, one is near the rear window in the stationary cab, and the third is on a cable which may be plugged into a receptacle located underneath the car sill. These controls are ordinary contact switches, similar to those used in the car signal system of this



The Position of the Boom Is Adjusted by Means of Air Hoists

company, each being built up of fiber with a small operating lever projecting, as described in the ELECTRIC RAILWAY JOURNAL for Sept. 1, 1923. Two switches, one for the hoist and the other for rotation, are provided at each operating station.

Before the hoist can be moved it is necessary to release the cab lock, which is operated from inside the cab. It is made up from ¾-in. steel plate which drops between stops on the floor. When the lock is raised clear of the stops a contact is made completing the control valve circuit so that operation of the air-valve switches is possible.

In order to steady the car when extremely heavy hoisting is done, and where there is danger of the car overturning, an outrigger is provided. A 6-in. I-beam, 8 ft. in length, is located in a roller pocket beneath the car floor, and may be pulled out on either side of the car. Hinged to the end of this beam is a 4-in. x 4-in. wooden block which folds up when not in use, but which fits directly under the end of the I-beam when pulled out, thus providing a sturdy brace which steadies the entire car while hoisting.

For winter service plow noses can be attached at either end of the car. These noses are adjustable through the use of simple raising levers actuated by 10-in. brake cylinders, which are installed outside the cabs, gravity sufficing to lower them. It is necessary, of course, that the rotating cab be locked in its normal position when using the snow plow on that end. Drawheads of cast steel are welded to the snow noses, so that there are no bolts or rivets in the drawhead. It is stated that these snow noses can be installed or removed within thirty minutes.

The air supply for brakes and hoists is obtained from a General Electric 130-A compressor, having a capacity of 50 cu.ft. per minute. Pipe attachments are provided so that pneumatic tie tampers or pneumatic concrete breakers can be operated from the supply of air provided by the car.

The main operating motors are controlled by K-28 controllers, with automatic reclosing line switches located beneath the car. An automatic cut-out is provided to prevent over-travel of the hoisting and rotating cables, shutting off the engines as the cables approach the limit of their movement.

For use at night, 94-watt portable incandescent headlights are installed on either side of each cab, and a five-light cluster, mounted on ¾-in. fiber, is located at the end of the boom. The cluster is easily removable, and the fiber protects the boom from accidentally coming in contact with the trolley wire.

The trucks were designed and built in the company's Madison Street shops, and all castings were produced in the company's foundry except side frames and journal boxes. These have given good service for more than two years, having been installed before the conversion of the car.

The car was designed by M. C. Garlick, supervisor of the Easton division, and was constructed under the supervision of W. C. Klein, superintendent of equipment

The Readers' Forum

Interchangeability and Standardization

DEPARTMENT OF COMMERCE
OFFICE OF THE SECRETARY
WASHINGTON, Oct. 18, 1923.

To the Editors:

In the ELECTRIC RAILWAY JOURNAL for Sept. 29, 1923, we note on page 520 your most interesting article on "Interchangeability and Standardization." We are particularly impressed with your remarks on page 521, beginning, "Standards of the type discussed may be established for a great variety of parts . . . ." This prompts us to ask your opinion regarding the possible usefulness of this division to the car-building industry in bringing about a reduction in the present variety of sizes and dimensions of many of the items enumerated in this paragraph.

We have co-operated with many different groups in reducing variety and find that our procedure offers a relatively short and effective method for obtaining satisfactory results. This does not interfere with the work of other groups, but, in fact, clears the way so that their standardization work can be carried on more effectively.

The inclosed bulletins by the U. S. Chamber of Commerce, which body is co-operating with us, show some of the things which have been simplified under the procedure referred to.*

*In this bulletin, among a long list of similar accomplishments in various fields, there appears the following items: The number of varieties of steam railway car wheels required was reduced from 175 to 4; dry cells from 17 to 6; hammers, axes, etc., from 2,752 to 761; lamp bases from 179 to 6; paving brick from 66 to 7; tires from 287 to 32; wheelbarrows from 42 to 16, etc.

Our point of view is that many of the items in present use do not need to be superseded by new or radically different types as standards, but instead, that present production and use could be concentrated on those articles of proved greatest demand or usefulness and that the other items which are not in such universal favor can be dropped or discarded.

We would like to have your views on this preliminary phase of standardization as applying to this particular field.

DIVISION OF SIMPLIFIED PRACTICE,
BY R. M. HUDSON.

[The editors replied that they believe there is an opportunity for this division of the Department of Commerce to contribute a very helpful influence in the work already under way in the American Electric Railway Association which might result in a much quicker accomplishment of the desired end. The matter was referred to President H. A. Johnson and Executive Secretary J. W. Welsh of the American Electric Railway Engineering Association for consideration.

The work of the Division of Simplified Practice is primarily to bring about a reduction of the great variety of types or styles of any article required by the trade. This is in the direction of standardization, though quite different from the program of standardization that has been followed by the A.E.R.E.A. It is distinctly a step toward securing greater interchangeability, which was one phase of the discussion in the article referred to in the Annual Convention Number. For example, if the thousand and one simple items on a car that are manufactured to perform a certain simple function, but are each made slightly different by each manufacturer, could all be manufactured to conform to a very few designs of each piece, what a help that would be to the railway company which has to stock spare parts for every design of every article used on all of its cars, in order to be prepared to make replacements.]

Equipment Maintenance Notes

Removing Wheels from Transfer Table Axles

By H. Cowen
General Foreman New York Railways, New York, N. Y.

WHERE electric railways shops are equipped with transfer tables, it is most important that they be maintained in proper repair at all times, in order to anticipate emergencies and prevent unexpected breakdowns. Renewals of motor equipment and control parts can readily be taken care of, but the replacement of broken wheels or axles usually is a very difficult proposition and one that consumes considerable time. In order to prevent tying up the transfer table over an extended period, some railways provide spare axles and wheels so that these may be inserted without delay.

The transfer table axles at the Fiftieth Street shop of the New York Railways were too long to be accommodated in the wheel press, and for many years wheels were removed and replaced by hand pumping. In this operation the cylinder, ram and yoke were removed from the hydraulic axle straightening press and an arrangement with two 1½-in. diameter tension rods fitted with end and intermediate tie yokes was used as shown in the accompanying diagram.

The hydraulic pressure used for removal of the wheels was provided by hand pumping, which constituted a part of the standard cylinder of the straightening press. When carried out by this means the job required four shop men and generally took from eight to ten hours to replace two wheels. The pressure used for pressing on was about 40 tons. Not only did this method require an excessive amount of time, but it also proved very tedious and trying on the men, who considered it as a "man killer," but were loyal and conscientious enough to tackle it whenever occasion demanded.

In order to improve on this tedious method and to reduce the expense involved in performing the work, connection was made to a hydraulic plunger pump located near by. This pump was attached to a 250-ton wheel press and a connection was made between the pressure cylinder and this pump by a ½-in. pipe. The tie rods and separators were assembled in the same manner as previously used, but the electrically driven pump furnished the hydraulic pressure. As a result of this, the time for renewing two wheels was reduced to two hours, and two men could take care of the job without difficulty. The composite saving, therefore, amounted to thirty-six man hours, and in addition the men were not overtaxed and emergencies were promptly met as they arose in the transfer table operation.

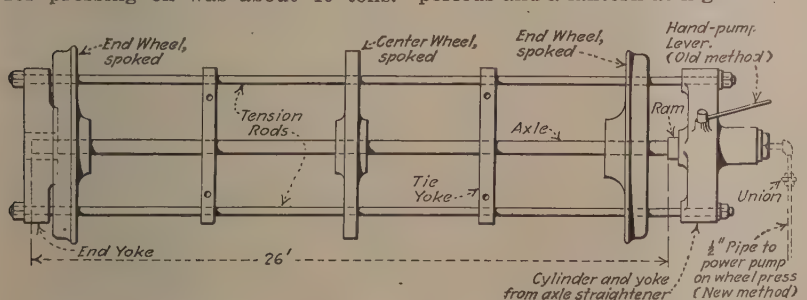


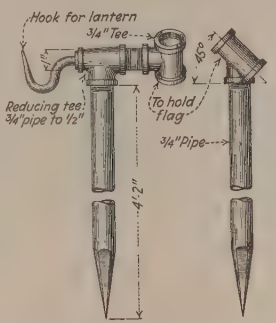
Diagram of Equipment for Stripping and Assembling Wheels on Transfer Table Axles

Pipe Staff for Flag and Lantern Signal

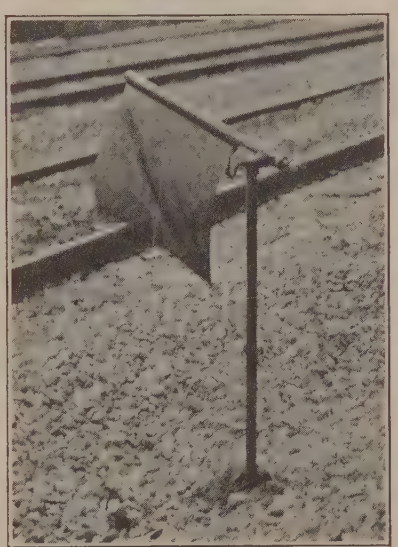
By Clifford A. Elliott
Engineering Department Pacific Electric Railway, Los Angeles, Cal.

THE Pacific Electric Lines found it necessary to provide a standard staff for flag and lantern signals used as a protection during track repairs. The rules of the road require foremen to place proper protection signals in advance of any work being carried out. These signals consist of a yellow flag during daylight periods and a lantern at night.

The staff used for supporting these signals is made of ¾-in. pipe with two tees, a nipple and a hook at the upper end. The upright is 4½ ft. long and is pointed at the bottom so that it can be readily placed in the ground. A reducing tee ¾ in. to ½ in. is screwed to the upright. The small end of the tee is bushed and a 1-in. iron hook is provided for hanging a lantern. A nipple is screwed into the ¾-in. end of the tee and another standard ¾-in. tee is screwed to this. This latter tee forms the support for the flag. The tee for holding the flag is placed at an angle, as it was found that this was most suitable for giving trainmen an unobstructed view of the flag. An accompanying illustration shows a flag in position.



Efficient Flag and Lantern Staff Used by Track Department of Pacific Electric Railway



Flag Signal in Position for Signaling Traffic

Grinding Air Compressor Cylinders

BY O. A. NORENE
Assistant Master Mechanic Omaha & Council Bluffs Street Railway

AIR compressor cylinders when badly worn or scored were formerly bored, bushed and reamed to standard size, a practice that was

Re-turning Tool for Truing Up Crankshaft

not very satisfactory. At present we are grinding worn cylinders and fitting them with oversize pistons. Two two-piece double-seal piston rings are fitted on each piston. Most of our compressors are ground to 0.020 in. oversize.

Crankshafts are tested and bearing surfaces are trued up with a No. 1 Weber crank pin re-turning tool. With this type of tool, a crankshaft can be trued up in a very short time. Compressor suction line strainers are located inside of the car in one of the seat pedestals. This has eliminated, to a great extent, the collection of grit and dirt in the crank cases of compressors, which we were having when strainers were located underneath cars.

Level Board for Track

BY J. S. WILDER
Engineer Maintenance of Way, Municipal Railways, St. Petersburg, Fla.

THE ordinary track level board which can be bought ready made is often heavy, awkward to handle and sometimes inaccurate. A much more satisfactory one can be very cheaply made in the railway shop. A graduated level having a movable shield to protect the glass, such as are to be found in machinists' iron levels, can be bought without the iron frame. By inserting a screw at each end of the level it can be very conveniently attached to a 5-ft. stick. A small square of sheet rubber packing is placed under each end and the screw passes through the center. This permits a slight adjustment to be made with a screwdriver.

The stick for the level board is made out of any convenient wood which does not warp too badly. A handy size is 1¼ in. x 2¾ in. x 5 ft. Both ends of the stick are shaped, It is planed to the desired size and laid out in the sun for a couple of days to season. If treated with oil it will warp less readily.

With such an apparatus, a difference of ⅛ in. from level on track will show a movement as great as ⅛ in. in the glass. While such accuracy is hardly needed in ordinary work, nevertheless it is sometimes of great convenience. Moreover, the marking of the track gage on the stick often saves time in making measurements.

What They Saw at Atlantic City

General Manager of Small City Railway Thinks $500 Well Invested—Representatives Present Preliminary Reports with Practical Suggestions for Improvement

"NOW while you fellows are drinking your coffee and lighting up the cigars which Charlie Riter is going to pass around, we'll get down to business, for I don't like these noon conferences to last too long." The speaker was William Redfield, general manager of the Jinxville Electric Railway, and the occasion was a luncheon meeting of his staff to listen to and discuss reports from the company's representatives at the Atlantic City convention of the electric railway associations.

"Sorry I couldn't go to Atlantic City this year. You know I was laid up with that lumbago I got the wet night we were out trying to get the crowds home safely after the county fair. John O'Neill and Bill Gainway made a good team, however, and we'll hear from them. You're first, John."

The superintendent of overhead, thus called upon, gave an account of the trip from Jinxville to the seashore and then said: "Of course I noted first the line materials. I was struck by the new things in overhead frogs. I think we can keep our trolley wheels on the wire better if we use up-to-date frogs with long approaches and no sharp angles. Then I learned a lot about automatic substations. I want to take up with you, Mr. Redfield, a plan for using one or two of them on our suburban lines. Tom Fairweather, our worthy roadmaster, would have been interested in a batch of broken rail joints that I saw; broken in a testing machine. Tom, it's up to you to know what that committee on welded rail joints is doing. Your joints will stand a little improvement.

"Another thing that struck me, fellows, was the fact that we're going to get the Engineering Manual in bound form. Our loose-leaf copies are always incomplete and out of date. Maybe it's our fault, but that's the fact. One thing more before I sit down. While I don't know much about car equipment, I think these new door-operating outfits are great, and I was glad to see that treadle-operated door that we've read so much about lately. That's all I've got to say today."

"Good speech, Johnny," was the general remark as he sat down. Mr. Redfield then called on Gainway, asking him to be brief as O'Neill.

"I'll cut it short all right, Chief; don't worry," was the rejoinder from the burly superintendent of transportation. "I'll second all John says and more about the interesting things we heard and saw. I'm sorry the whole bunch couldn't have been there. It was great.

"Now for some things John left for me to say. Did anybody say "buses?" You ought to have seen 'em—buses everywhere. It seemed like a bus convention in many ways. We've got to have a few here, Mr. Redfield. I'm sure I can sell you the idea. But there was a lot for my department besides buses. Take accidents, for example. The claims fellows are getting their grip on this thing and we operating men must cooperate with them. I heard a lot of good stuff about managing men, too. It all comes down, in my opinion, to treatin' 'em square. No coddlin', just a square deal. I noted that the claims agents and accountants are getting busy on ethics. It won't hurt any of us to be a little particular about such matters. Now when we get together again I want a little more time. I see the chairman winkin' at me so I'll sit down. No applause, please.

"Wait a minute, Mr. Redfield, one thing more. You know we talked about pull-ins, lately. Well, a chap from Memphis named McWhorter gave a report on that subject that struck me as a transportation man. It seems a lot of the master mechanics down South have a competition on pull-in records. They're getting great results. Wish we could get in on that."

"Well I'm glad we spent $500 sending John and Bill to Atlantic City," said Redfield, rising. "It's a good investment. But if we are to make the most of it we must change our practice here and there as our new information shows that to be desirable. I want John and Bill to call attention to anything they see around here that does not come up to the standards of the Atlantic City convention. We'll make improvements as fast as we can afford to make them.

"The meeting's adjourned."

New Equipment Available

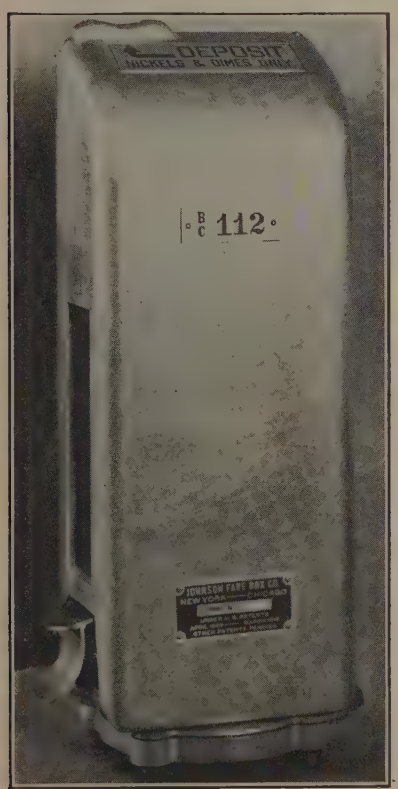
Fare Register and Coin Box Electrically Interlocked

ON THE new cars of the Brooklyn City Railroad, described elsewhere in this issue, fare collection will be accomplished by means of a Johnson type J coin box and an International R-11 solenoid-operated overhead register.

A fare box as shown in the accompanying illustration is mounted on a pedestal in the center of the car. The passenger deposits his fare in the slot where it drops by gravity into a position making an electrical contact which operates a magnet. When this magnet is energized, it lifts a plunger which closes a second electrical circuit connecting with the overhead register and pushes the coin onto an inspection tray. The register is mounted on the inside of the bulkhead and is the usual type of International register with a simple magnetic actuating device attached to the rear.

The box is designed to receive either nickels or dimes, registering one fare for a nickel and two fares for a dime. Double registration for a dime is accomplished by allowing it to drop into a second and lower position, where the circuit is again closed. The nickel, being larger, will not drop into the lower position, but passes immediately to the tray. In the side of the box is a glass window so that the conductor can tell at a glance what coin has been put in the box. After registration the coin drops into a return chute, where it is available to the conductor for making change. The apparatus is adapted for use where there is a straight 5-cent or a straight 10-cent fare, or where all fares are paid by the use of a token of some uniform size.

An Electric Actuating Device Is Attached to the Rear of the Register



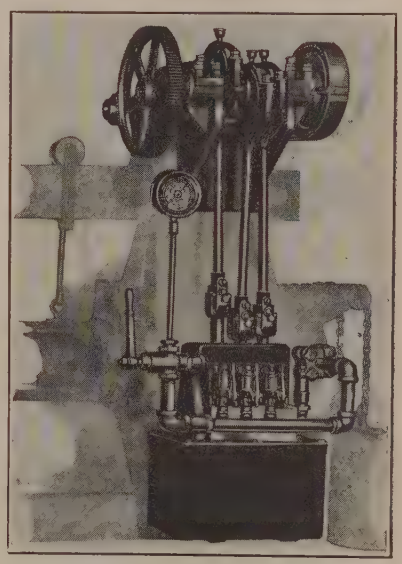
A Window in the Side Permits Conductor to Inspect the Money

New Pump for Wheel Presses

A NEW pump has been developed by the Hydraulic Press Manufacturing Company, Mount Gilead, Ohio, for use with its wheel presses. Extreme rigidity, careful guiding of all reciprocating parts and provision to take up wear are features of this pump. Due to the reciprocating motion and the high speed at which pumps for hydraulic wheel presses operate, they are subject to more deterioration on account of wear than other parts of the machine. In the design of this new pump particular attention has been given to overcoming these difficulties.

The cylinder block for the three-plunger, high- and low-pressure type of pump, is mounted on a casting which acts as a cover to the self-contained reservoir. This cover is provided with machined pads for the forged-steel cylinder block and the cast crosshead guide. The cylinder block is a one-piece steel forging with plunger and valve cavities bored out. Bronze seats are provided for the valves. The one-piece cast crosshead guide is provided with babbitted bearings. The crossheads are of large diameter so as to reduce the bearing pressures resulting from side thrust. Grease-cup lubrication and wedge-type brass adjustable take-ups are provided in the crossheads.

The Class "SS" pump is furnished in either two- or three-plunger types. With two plungers both are of the high-pressure type, while with the three-plunger construction, one low- and two high-pressure plungers are provided. Automatic knock-out or pump unloading valves of the spring-loaded type are connected to the pressure chamber. The springs are set to balance at a predetermined hydrostatic pressure. When this is exceeded the springs compress and cause a system of levers to raise the suction checks from their seats, thus rendering the particular cylinder which they serve inoperative. This is accomplished automatically and permits the low-pressure part of the stroke to be accomplished at high speed with all the plungers of the pump operating. As the work in the press increases the pressure builds up the knock-out valve on the low-pressure cylinder and holds the



Three-Plunger High and Low Pressure Type of Pump for Hydraulic Wheel Presses

check from its seat, rendering the cylinder inoperative during the balance of the high-pressure stroke. The high-pressure cylinders are also provided with knock-out valves which are adjustable and can be set to release at a predetermined pressure.

In addition to operating automatically the knock-out valves are provided with hand levers and they may be thrown out at the will of the operator. The hand levers do not effect the automatic operation of the knock-out valves. The Class "SS" pump is provided in four sizes, from 7½ hp. to 15 hp.

New D.C. Control Relay

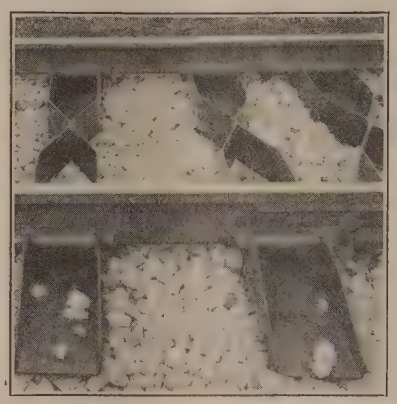
A MODIFICATION of the control relay known as the type S has been developed by the Westinghouse Electric & Manufacturing Company. Control relays are generally required for the closing-coil circuits of electrically operated air and oil circuit-breakers. The type S relay adds a trip free feature to the circuit-breaker control system, thus preventing the breaker from being held closed by the operator in case of a short circuit.

The type S control relay is provided with a two-piece contact arm and a release coil. As soon as the circuit-breaker is closed by the operator, the pallet switch on the breaker energizes the release coil of the control relay. The release coil opens the contacts of the control relay, irrespective of the fact that the operator may hold the control switch in the "closed" position and thus still be energizing the main coil of the control relay. This arrangement requires that the operator return the control switch to the "off" position before he can again close the circuit-breaker.

Control Relay with Knife Panel Switch

All-Metal Railway Tie

AN ALL-METAL railway cross-tie with several new features is being placed on the market by the Metal Safety Railway Tie Company, Philadelphia, Pa. This tie is of a channel type made to standard dimensions. Its construction permits of considerable flexibility, but is such that heavy tonnage thrusts and wheel shocks are received and absorbed.



Section of Track with Metal Railway Ties

Pockets are provided in the upright side of the tie to act as seats for the rail, which are held in position by wedges. Two semi-sleeve type wedges are used, one on either side of the rail at each pocket. When inserted they are driven home with a heavy maul. The rails are thus anchored to each tie and the wedges resist longitudinal and lateral thrusts. This method prevents widening of the gage and retains the rails firmly in a perpendicular position.

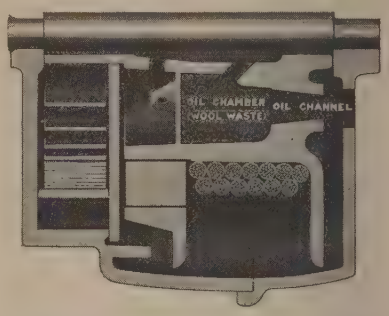
The metal safety ties can be applied to any size or section of rail and do not necessitate any departure from the rail or joint punching in use. At points where it is necessary to insulate the tracks for signal circuits this can be taken care of by using a fiber lining in the wedges.

A Self-Lubricating Trolley Catcher

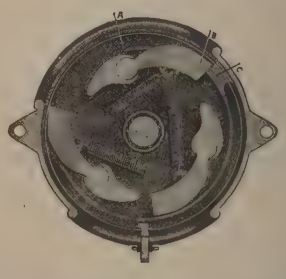
DUE to its location on the dasher of a car, the trolley catcher is subjected to the most severe weather conditions. The construction must be more or less open in order that it may function properly, and this exposes the parts to the influence of snow, rain and dust. Adequate lubrication is therefore of great importance.

The Ohio Brass Company has recently improved the O.B. catcher by providing means for oiling all parts with one application of oil through a single opening. This is done without removing or deranging any parts of the catcher or taking it off the dasher of the car. In the center of the new device there is a chamber packed with wool waste with outlets leading to the center stud and the throw-out dogs. It is necessary only to engage the reel latch with the reel and insert any ordinary oil through the opening in the cover thoroughly to saturate the wool waste. The rotation of the reel in its regular operation will then produce lubrication at every point where it is needed.

Another feature of this catcher is the positive protection against stepping-up. When the trolley wheel leaves the wire and the catcher is tripped, one of the dogs will slide over the guide, indicated by letters *A-B* in the accompanying illustration, and engage with stop *C*, preventing any further upward flight of the pole. Rebound of the pole cannot cause any stepping-up as it is necessary for the dog to back from *B* to *A* before it is released from the guide to assume its normal position. The guide is of sufficient length to permit taking in more of the rope than that which is released by the rebound effect.

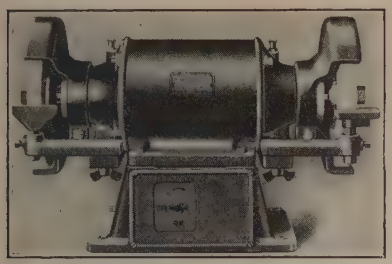


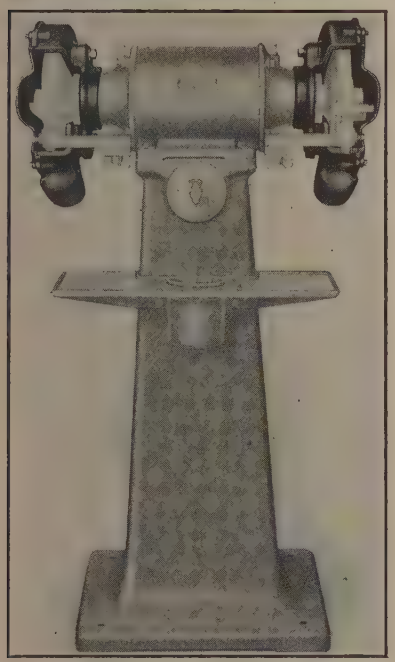
In the Center of the Reel of This Trolley Catcher Is a Chamber Containing Oil-Saturated Waste



The Dog Does Not Release Until the Reel Is Turned Backward Nearly a Quarter Revolution

The new Brooklyn cars described in this issue are equipped with these catchers.





New Type Grinders—Above, Bench Grinder. Below, Floor Type

Improvements in Floor and Bench Grinders

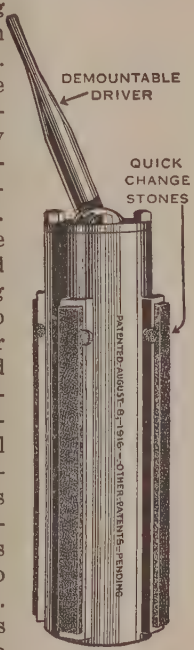
SEVERAL new features have been introduced into the design of floor and bench grinders being marketed by the Hisey-Wolf Machine Company, Cincinnati, Ohio. The control of the operating motor is by a button located on a plate in front of the machine with the switch proper completely inclosed in the base. This mounting insures protection for the parts and gives ready access to the switch mechanism by removing the cover plate.

The end heads for the operating motor are cone shaped, which gives the maximum working space around the grinding wheels. Combination wheel guards are provided with removable end covers and exhaust pipe connections. They are adjustable to any angle and to provide for wheel wear. They are designed so that the wheels can be removed independently. The spacing between the two grinding wheels is made particularly large, so that two operators can work without interference.

Ball bearings are used throughout, and are mounted in motor end caps in close proximity to the grinding wheels. The bearings are completely inclosed from dust and dirt and provided with heavy felt washers on each side of the bearing housing.

Tool for Resizing Compressor Cylinders

THE National Brake Company, Buffalo, N. Y., is marketing a device for resizing compressor cylinders, which is called the Auto-Hone. This consists of a center arbor with honing stones mounted on its circumference. The position of the stones is adjustable, so they may be made to fit cylinders between 3½-in. and 4½-in. bores. Pressure on the stones is regulated from the driving end of the tool. To grind the cylinder the tool is slipped in and is then connected to an ordinary electric drill by a demountable driver. As the Auto-Hone revolves, the stones grind the walls to cylindrical shape. Two sets of stones are furnished, one for quick cutting and the other for fine honing. The stones are 8 in. long and bridge the area of wear so as to grind the full length of the cylinder. One set of stones will grind about 100 cylinders.



Device for Grinding Compressor Cylinders

New Railway Lightning Arrester

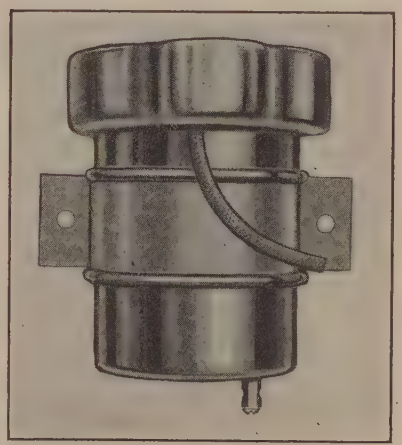
THE Electric Service Supplies Company has placed on the market a new type of direct-current railway lightning arrester, intended for both car and line service, and known as their type IC. These arresters have been designed to fill the demand for a highly efficient railway lightning arrester completely incased in porcelain.

Type IC arresters are entirely self-contained; that is, they do not require an external protecting box, and are so constructed as not to require or permit inspection. The maintenance of the arresters is practically limited to the replacing of damaged units. From experience gained through the use of porcelain-incased arresters on power and lighting circuits of some of the larger central stations, indications are that the total annual maintenance costs may be kept well below 1 per cent of the original cost of installation.

The new arresters permit of easy and cheap installation and are small enough to be installed on the most crowded pole or in any convenient location in a car.

These new arresters consist of a porcelain body, entirely sealed, which houses the operating mechanism. The arrester is of the spark-gap type, and for interrupting the flow of power current following the lightning discharge to ground, use is made of the long standard Garton-Daniels circuit breaker principle in a modified form. In this new arrester a permanent discharge path is provided from line to ground. The circuit breaker path is normally open and forms a shunt to a portion of the discharge path. The power current following a discharge to ground closes this circuit breaker path, transfers the dynamic current flow from the discharge path to the circuit breaker path, de-energizes the solenoid-operating coil and permits the circuit breaker to cut off the flow of power current to ground.

Due to this particular construction it has been possible to secure a very compact unit and one whose efficiency is high. The same arrester is used for both car and line service, different hangers only being provided for the two conditions. The arrester being entirely self-contained enables one to tell at a glance whether it is in good condition or not.



Spark-Gap Self-Contained Type of Lightning Arrester

American Association News

Exhibits Finest and Largest Ever Displayed

Many New Devices Were Shown—Something of Interest for Each Department of the Electric Railway—Space Devoted to Buses Was 24 per Cent of the Total

THE display by manufacturers at the forty-second annual convention of the American Electric Railway Association surpassed all previous records. A total of 167 exhibitors had displays, which occupied 75,930 sq.ft. of space. Of this amount 374 sq.ft. was outside the pier in various track exhibits.

A particularly noteworthy feature of the display was the large amount of space devoted to bus exhibits and accessories, which consumed 24 per cent of the space. At last year's convention in Chicago, out of a total of 62,000 sq.ft., 11 per cent was taken by bus exhibits. This year's record for space taken by bus companies is thus three times that of the Chicago displays.

There have been very interesting exhibits at the association conventions in the past, but none, in the opinion of those in attendance, where more new developments were shown. There was something instructive for each department of the electric railway.

Automatic Substation and Remote Control Developments

Power men found much of interest in the developments shown in apparatus for automatic substation and remote feeder control. New apparatus showed the adaptation for this service of electro-pneumatic contactors of standard types used in electric railway service for starting and running synchronous converters. Small synchronous converters with high-reluctance interpoles can be started successfully without raising the brushes from the commutator and the automatic control for such machines is simplified thereby. Other interesting developments included a pneumatic mechanism for closing oil-circuit breakers, supervisory control for switching equipment of all kinds at remote points and remote load indicating devices for transmitting meter indications over two-wire telephone circuits or their equivalent.

Way and track men found much of interest in a large variety of trackwork, tie and welding exhibits. The association's exhibit showing samples of various welded rail joints tested to destruction, together with photographs showing the methods used in making the test joints, received considerable attention. New designs for frogs and switches showed the attention that is being given toward developing trackwork that will give longer life with less trouble in service. There were a large number of exhibits of metal and substitute ties for both open and closed tracks. The new types showed that much attention is being given toward producing a satisfactory substitute tie. Welding displays were more elaborate than ever before and several new track grinders were shown.

The increased use of cars operated by one man has resulted in improvements in overhead construction to prevent trolley wheels from leaving the wire. Several new designs of overhead frogs were shown. A universal frog with overlapping runners has been brought out which prevents the flanges of trolley wheels from running on the pan.

Improvements in fare collection and registering devices have also been influenced by one-man operation of cars. New designs show a trend toward instantaneous registration, more rapid operation, reduction in weight and simplification of mechanism to relieve operator of duties.

Equipment for controlling and operating doors and steps also showed considerable advancement. Operation has been simplified to reduce trouble and save time. Special consideration has been given to preventing accidents. Thus in one new design shown the failure of the air supply or an open circuit in the electrical circuit closes the door automatically.

Other parts of car equipment showed interesting improvements. A new light-weight control equipment was shown for the first time and a fan ventilation attachment for application to old motors was said to make it possible to increase their capacity 36 per cent.

There were many developments in electric heaters and thermostatic control equipment. New heating elements imbedded in insulating material permit of many new designs of heaters such as the floor type, which was exhibited. The use of high-grade resistance wire is quite general and permits new types of construction of other parts.

Equipment for the Accountants Shown for First Time

The accounting and auditing departments of the railways, found much to interest them this year in the large number of exhibits containing new coin counting and wrapping machines, also improved calculating and listing machines.

Exhibits outside the pier included an electric trolley bus and two electric locomotives. The trolley bus was one of those purchased for use on Staten Island, N. Y. One of the electric locomotives was for service on the Glendale & Montrose Railway. This locomotive weighed 99,000 lb., had a total wheelbase of 22 ft. 6 in. and was provided with 36-in. diameter wheels and 5 x 9-in. journals.

Statistics on Bus Exhibits

There was a total of twenty-six gasoline-driven motor buses and one electric trolley bus shown. Of the twenty-six gasoline-driven buses, seventeen were of the street car type, six were of the sedan or limousine type, three were double deckers and one was of observation type. The street car types seat from sixteen to twenty-nine passengers on a single deck, while the intercity coaches accommodate from seventeen to twenty-four passengers. The double deckers carry from fifty-one to sixty-seven. Five of the limousines had smoking compartments that accommodate from six to eight persons.

For the most part, the street car types were finished with leather seats, only six having rattan, which is the popular choice on the three double deckers shown. Seven of the buses and chassis on exhibition had air brakes, in one case on all four wheels. Pneumatic tires in sizes ranging from 32 x 6 to 36 x 6 seem to be most favored with dual rears. The doughnut type of tire with 20-in. wheels was found in one exhibit.

Prices f.o.b. factory for the city type buses exhibited ranged from $2,400 to $8,000. For the long-distance intercity buses with smoking compartments the cost is higher, in fact the range is from $7,000 to $10,000. The double-deck buses exhibited cost approximately $9,000.

Special Reports Available

The Bureau of Information and Service of the American Electric Railway Association states that the following special reports have been prepared and are available to member companies in good standing upon request:

Wage Bulletin No. 128—For each of nearly 400 companies there is shown the rate of wages in effect Oct. 1, 1923, the date the rate became effective, the date of expiration, the average weekly wage earned under this rate, bonuses paid, previous rate of wages and the effective date, the union status of the trainmen and the wages of bus operators where the company operates buses.

Effect of Fare Changes on Revenues and Riding Habit—A group of companies having two or more fare changes has been selected and for each company there is shown the cash fare, ticket rate and transfer charge, if any, and a month by month statement of the number of cash passengers and ticket passengers, and the passenger revenue divided between revenue from cash fares and revenues from ticket sales.

The Weekly Pass—Gives a list of companies using the weekly pass with the effective date and the rate at which the pass is sold, together with figures showing the number of passes sold per year, the average number of rides on each pass, the average fare per passenger before and after the pass was introduced, the methods of introducing the pass and statement of the company's views as to the advantages and disadvantages of the pass.

The Indeterminate Permit—Contains copies of state laws providing for indeterminate permit, indorsements of it by public bodies and numerous public statements and arguments in favor of the general use of this type of franchise.

In addition to the above supplements to the Fare Bulletin and Cost of Living Studies have been prepared bringing this information down to date.

The News of the Industry

Thompson Policy Reversed

Chicago Is $8,189,128 Richer Under the Policy of Conciliation of New City Administration

The City Council of Chicago on Oct. 17 voted unanimously to repeal the 1921 ordinance forfeiting the franchise of the Chicago Surface Lines. At the same time it approved the abandonment of pending forfeiture suits, voted to accept the city's share of the companies' profits, aggregating more than $8,000,000, and paved the way for immediate service improvements even while negotiations are under way to bring about municipal ownership of the traction system.

All these things were done on the recommendation of Mayor Dever. In other words, the City Council has reversed the attitude toward the company taken during the administration of former Mayor Thompson, who kept the traction question an issue in political campaigns.

After rising operating costs had made it necessary for the state regulatory commission to increase the fare in Chicago above 5 cents, Thompson insisted that the Chicago Surface Lines had broken its contract with the city, and the City Council, at his request, passed a measure forfeiting the 1907 franchise ordinance, under which the companies operate. The city law department also filed forfeiture suits against the traction lines and the city administration refused to accept the city's 55 per cent of the companies' net receipts since 1920, on the theory that it would prejudice the settlement of the forfeiture suits.

The city's share of the companies' profits which have been offered each year, but not accepted, now aggregate $8,189,128. If this amount had been accepted the city's traction fund would now total more than $36,627,000. By the Thompson administration's refusal to accept this money it is estimated the city lost $650,000 in interest.

Mayor Dever, in his message to the City Council, which resulted in tossing the policies of the former administration overboard, called attention to the fact that negotiations had been opened between the city authorities and officials of the Chicago Surface Lines looking to the purchase of the system by the city. He added that officials of the elevated lines are out of the city, but that conferences will be held with them in the near future, for the same purpose.

Mayor Dever said:

I respectfully request that you pass at once the ordinance recommended by the local transportation committee, repealing the so-called forfeiture ordinance of Feb. 4, 1921, and directing the corporation counsel and the special traction counsels, which I transmit herewith.

I concur in their conclusions that the results of the suit and ordinances have been detrimental to the best interests of the city and beneficial only to the surface line companies.

The policy pursued resulted in the city's refusing to accept since 1920 the city's 55 per cent of the divisible net receipts of the Surface Lines, amounting now to $8,189,128.

The institution and pendency of this suit have for the last four years obscured vital phases of the local transportation problem.

Based as it was on an erroneous theory, it has held false hopes impossible of realization, and at the same time has paralyzed all constructive efforts by the city to compel the companies to live up to their obligations under the ordinance.

Each time it was proposed by the City Council to take affirmative steps to procure performance by the company of its ordinance obligations to give better service or construct further tracks it was met with the objection that such action must not be taken because it would be inconsistent with and interfere with the prosecution of the forfeiture suit. In this way the companies got all the advantages of their franchises, because action by the city was suspended; they were relieved of their obligations under the ordinances.

With the forfeiture suit and ordinance out of the way, the city again will be in position to demand and enforce a complete compliance with those provisions of the ordinances, which under the decisions of our Supreme Court are binding upon the companies and enforceable by the city.

If then the companies fail to comply with those terms of the ordinance and thereby commit substantial breaches of their obligations, the city will be able to declare a real forfeiture and to institute proper suits to bring about a cancellation of the companies' rights.

The Mayor's legal advisers also recommended that the city appoint its representatives on the two boards of supervising engineers, who oversee the operation of the traction lines.

How the New Award Works Out in Boston

As was announced in the ELECTRIC RAILWAY JOURNAL, issue of Oct. 20, a wage increase of 9 cents an hour was recently awarded the 7,500 employees of the Boston Elevated Railway. How the award actually works out in cents per hour for surface line men and rapid transit employees is shown in the accompanying table.

Surface lines, motormen and conductors:

First three months of service	57
Next nine months of service	63
Thereafter	70

Rapid transit lines, motormen:

First year of service	71
Thereafter	72

Rapid transit lines guards:

First three months of service	57
Next nine months of service	63
Thereafter	70

One-man car operators and bus drivers—8 cents per hour in addition to regular rate.

Snow work—Time held or worked.

Conductors, motormen or guards, 20 cents per hour in addition to regular rates.

Conductors, motormen, guards, gatemen, collectors, train clerks when instructing learners, 12½ cents per hour in addition to regular rate.

Settlement Plan Suggested

Ten-Cent Fare and Relief from Paving Burden Are Being Sought by Davenport Road

A comprehensive plan for rehabilitating the railway system of Davenport as a successful and continuing business has been proposed to the City Council by B. J. Denman, president of the Tri-city Railway of Iowa.

A 10-cent fare, a new car rerouting system, permission to operate single-truck cars on some lines, abandonment of some trackage, a lower revaluation of traction line property, backing by the city of a bill in the Legislature to give special chartered cities power to fix paving assessments on railway lines are the main points in this plan.

The increased fare would result in an increase in revenue of $109,299 annually, Mr. Denman estimates. The elimination of trackage would reduce operating expenses $50,000. The nub of the whole matter, however, is the burden of paving cost, now assessed against the company by state law. Under this law the company is compelled to pay the entire cost of paving between its rails and 1 ft. on either side. It is proposed to introduce a bill in the Iowa Legislature allowing special chartered cities, among them Davenport, to meet the cost of paving as they shall see fit. If this bill passes it will be understood that the Davenport City Council makes an equitable adjustment with the traction lines on paving. The suggestion has been made that the company pay for the foundation under its tracks and the city meet the cost of surface paving entirely, either by tax on abutting property or partly from a general fund.

The rerouting system asked was turned down by the City Council some time ago. It provides for the elimination of approximately 5 miles of track, a large increase in service, building of passing tracks, a generally faster schedule and an expense of approximately $400,000 to the company.

It is also proposed that the assessed valuation of $2,000,000 be reduced and the value of the property be more nearly based in its ability to earn. The Council has not the authority to make this reduction, but it could assist when the proper time comes, Mr. Denman states.

The Council received the communication and a special committee consisting of the standing committee on transportation, the Alderman-at-large, the Mayor and the city attorney was appointed to handle the problem.

The company, through Mr. Denman,

had stated some weeks ago that unless financial relief were granted operation of the railway would cease. Prominent business men, Councilmen, the daily press and labor organizations clearly indicated that street cars are wanted and that concessions must be made to keep the system in operation.

The daily press, in commenting on this latest plan of the company, suggests that it is the basis of a constructive solution of the railway problem and that the traction lines and the Council should be able to come to an understanding that will remove the existing drawbacks to successful operation and provide for operation, adequate to the city and profitable for the company. The press, however, suggests a lower fare than 10 cents for habitual riders. The present fare is 8 cents.

Mr. Denman's letter to the Council contains an estimate of operation under the conditions outlined in his request. He says that it should not be overlooked that the riding is continually decreasing, due to the increasing use of the automobile. The expressed belief of the company is that its traffic will decrease 10 per cent with a 10-cent fare, due in slight measure to the increase in fare, but in greater measure to the increasing use of the automobile. Assuming, however, that there is a decrease of 7 per cent in the traffic, it is estimated a 10-cent fare would produce an increase in revenue of $109,299. This is arrived at by applying the proposed fare to the number of passengers in each class carried, and the increase in revenue arrived at as indicated in detail in one of the exhibits attached to the application.

Mr. Denman says that it will be some time before the operating economies mentioned in the application can be effected, and until that time the new fare would give the following results:

Annual revenue as shown in Exhibit D	$856,176
Less operating expenses, taxes and depreciation	706,307
Net return on investment	149,868

According to Mr. Denman, this gives a return on the valuation of Burns & McDonnell of 1920 (not including construction since that date) of 4.61 per cent. It should not be overlooked that operating expenses for the past twelve months include an increased wage to train and shop men since June 1. He says that had the new wage been in effect the previous nine months, expenses would have been increased and the net revenue decreased by that amount. When the operating economies previously mentioned are in force, it is estimated that a saving of $50,000 per annum will be effected, thus making the total net earnings available for return $199,868, or 6.14 per cent on the valuation of Burns & McDonnell.

During the past six years the company scarcely made operating expenses, and it was impossible to maintain the property adequately. It is explained that this relates particularly to the overhead work and that it is necessary to spend at least $50,000 to put the poles and trolley wires in proper condition. This will be an additional item in operating expenses, not taken into account in the discussion. Mr. Denman says that a great deal of this work will have to be done within the next twelve months and practically all of it within the next eighteen months. He assures the Mayor and the members of the Council of the sincere desire of the company to be of every possible assistance to enable them to check the correctness of the figures presented by the company.

Injunction and Damages Sought by Maumee Valley

Precedent may be established in Ohio when the Common Pleas Court at Toledo makes a decision on the petition of the Maumee Valley Railroad seeking to enjoin the Ohio-Michigan Coach Line from operating a parallel bus service without a certificate of convenience and necessity from the State Public Utilities Commission. The plaintiff claims the operation of the bus line is "unlawful competition" because other provisions of the new state bus regulatory law have not been complied with by the bus company.

The railroad recently spent $500,000 in providing new cars and equipment and speeding up service for the communities served.

In addition to the injunction the railroad seeks an award for damages it has suffered while the buses have been operating.

The court has taken the matter under advisement following a recent hearing on the petition.

Wage Settlement Reached in Springfield, Ohio

An increase of 3 cents an hour was granted platform men of the Springfield Railway, Springfield, Ohio, under the terms of a new scale after negotiations extending over a period of six weeks. The new scale, retroactive to Oct. 1, provides for 45 cents for the first three months, 47 cents for the next nine months and 49 cents thereafter.

The new scale represents a compromise offer by the company, the second to be made by it during the negotiations. The first compromise proposed a scale of 44, 46 and 48 cents. The carmen had demanded 46, 48 and 50 cents. The former scale was 42, 44 and 46 cents.

The company threw its books open for inspection by a committee from the union and made a second compromise offer, which was accepted. Some slight changes were made in the working conditions, one of these being the agreement by the company to supply tickets to the conductors and to collect for them at the end of the day. Heretofore, the conductors have been required to pay cash in advance for tickets. The conductors will still carry their own change. The scale continues the nine and one-half hour day basis on a seven-day week.

No Inequality to Seattle-Rainier Charge

The State Department of Public Works has found that since the Seattle 8½-cent carfare there is no inequality to the same charge by the Rainier Valley line. Walter B. Beals, assistant corporation counsel, who represented the city of Seattle at the hearing, said that although the complaint had been dismissed, most of the petitioners' grievances had been righted by the company on its own initiative since the hearing before the department handed down its ruling. He cited the granting of school fares for children at ten tokens for 25 cents, the same rate charged by the Seattle Municipal Railway; abolition of the transfer charge, under which patrons formerly paid 10 cents if they wished a transfer to the Municipal Railway, and the company's concession by which patrons can buy three tokens for 25 cents instead of buying 50 cents worth at one time. The department, tentatively accepting the company's valuation and operating costs, found that it was getting a return of 4.72 per cent, after the president's salary had been listed at $3,000. It commented on the non-resident president, pointing out that he lived in the East and acted as financial agent for the company, as well as for several other firms, and spent only two or three weeks in Seattle every year.

Service Restored in Milan

The Milan, Ill., tangle, involving a proposed new franchise for the operation of cars of the Tri-City Railway and the extension of the company's service, curtailed early in the summer by the hard road construction work, was adjusted at a conference between T. C. Roderick, general manager of the railway, and a special committee from the Milan town board, headed by Mayor B. H. Rollis. Under the agreement reached the railway will be completed in a short time and service restored to the Milan residents. The new route will cut off three blocks of the old car line routing. The franchise of the Tri-City Railway to operate cars in that village expired on Aug. 28 and up until the settlement the company had not indicated that it wished to resume service through the city.

Railway Troubles Discussed.—A public meeting was held recently in Anderson, S. C., at which the entire railway situation was gone into in an effort to devise some means to lighten the burden on the Southern Public Utilities Company. Efforts are being made to avert, if possible, the threatened suspension of service. It was brought out that revenue from street car service is not now sufficient to pay for operation, to say nothing of interest on bonds, taxes, depreciation, etc. No definite plan to aid the company to keep the system in operation was decided upon, but it was intimated that Council might relieve it of a part of its tax burdens and of its street paving assessments.

No Agreement in Cincinnati Over Replacement Expenses

At a recent meeting of the directors of the Cincinnati Street Railway no agreement was reached in the controversy between the company and the Cincinnati Traction Company over $4,000,000 of repairs and replacements to the street railway system. Several members insisted that the arbitration procedure be abandoned and that the controversy be taken into the courts for immediate settlement. Another group contended that if the differences between the two companies could be settled by arbitration that was the proper course to take. It was said that any settlement made would be with a view of eventually returning the traction properties to the Cincinnati Street Railway, which leased it to the traction company in 1896 for a period of fifty years. It is understood that the lessor company would eagerly take back the system, but not in its present condition.

The directors of the Cincinnati Street Railway have intimated that the necessary repairs and replacements as outlined in the report of Stone & Webster, engineers, who made a survey of the traction properties, would have to be made or the amount necessary to make these improvements deducted from the selling price before it would consider any proposition. The Cincinnati Traction Company, on the other hand, is willing to surrrender its lease, but under no circumstances will it sell at a sacrifice price. The Cincinnati Traction contends that it has expended approximately $13,000,000 in repairs and betterments to the traction system since it took it over and that this amount must be taken into consideration. On the other hand, the Cincinnati Street Railway charges the lessee is in default of the covenants of the lease to the extent of $4,000,000.

Magazine Articles Helpful to Railway Men

Forbes for Oct. 13 might almost be called an electric railway issue. In it are told "How the North Shore Line Set Out for a Goal and Made It," by Neil M. Clark; "How Paul Shoup Made His Mark," by B. C. Forbes, and the story of "A Merit and Bonus System that Rewards and Fires," by Charles Alma Byers. On the cover is a full-length half tone of Britton I. Budd, the president of the North Shore. All of the articles are illustrated, the pictures including portraits of Mr. Shoup and of George Baker Anderson, originator of the merit and bonus system of the Los Angeles Railway and manager of transportation of that company. To readers of the ELECTRIC RAILWAY JOURNAL the personal accomplishments of these men and their achievements for the companies with which they are connected are pretty well known; but all of the stories, written by men trained in the school of popular magazine work, are most helpful to the railway man, in that the authors have unconsciously reflected in their stories the viewpoint of the general public about railway matters.

Will Extend Chicago "L"

Plans have been formulated for an extension to the Northwestern branch of the Chicago "L" system at Howard Street and a company has been organized to prepare the right-of-way. This new organization, to be known as the Chicago, North Shore & Northern Railroad, after construction is completed, will enter into an agreement with the Chicago Elevated whereby it will be possible for the Elevated to operate its cars over this new company's right-of-way. The proposed trackage will start at Howard Street, or the city limits, form whence it will proceed dircetly west 3 miles to Cicero Avenue, and then turn north and proceed 2¾ miles to Dempster Street, Evanston. Stations at appropriate locations will be constructed along the line, while terminal facilities and yards will be provided at the Evanston-Dempster Street end. The construction will include submerged right-of-way and elevated structure wherever necessary.

Future plans call for a connection between the Dempster Street terminal and the Chicago, North Shore & Milwaukee Railroad's right-of-way at North Chicago. Such construction would make possible the operation of the present North Shore's Chicago to Milwaukee electric trains over a private right-of-way which skirts the numerous municipalities located between Chicago and North Chicago. This would cut down considerably the running time for the North Shore "De Luxe" through trains.

Special Permit Granted.—The Rockford & Interurban Railway, Rockford, Ill., has been granted a special permit to operate cars for a period of ninety days after Oct. 3, when the franchise expired. Negotiations for a new franchise are now under way.

Signs Taraval Line Bill.—Following a conference with President T. A. Reardon of the Board of Works, Mayor Rolph of San Francisco has ordered through service on the San Francisco Municipal Railway from the Parkside to the ferries. The service is to be put into effect right away. The Mayor said that the development of the district served by the Taraval line would increase the assessment of San Francisco and for that reason he believed the best interests of the city were served by this extension of service.

Engineer Reports on Washington-Baltimore Road.—A report on the financial operation of the Washington, Baltimore & Annapolis Electric Railroad and the Annapolis & Chesapeake Bay Power Company, covering the years 1911 to 1922, has just been issued by J. A. W. Inglehart & Company, Baltimore. This report, which was prepared by W. T. Ballard, states that the physical properties were found to be in good condition, and while it is not possible that they will ever have a spectacular growth, their progress promises to be constant. The earnings of both companies have been fully sufficient over a period of years to protect interest requirements on the bonded indebtedness.

May Nullify Franchise.—At a recent meeting of the City Council of Milwaukee the company was charged with violating its promises by permitting the freight and baggage interurban cars to be operated over the streets in West Allis. The Council approved taking measures to nullify the present franchise, granted the company several years ago. The controversy, it is said, is an outgrowth of the track removal question which has been a matter of discussion for some time. The plan of the city is to have the company move the tracks on Burnham Street from the north side to the center of the road at the company's expense. The failure of the company to make this removal may result in the halting of service.

People to Decide Trolley Fate.—At a recent meeting of the committee of the whole of the Board of Estimate of New York, Borough President Connolly, discussing the operation of the New York & North Shore Railway, said that the residents of Flushing, Whitestone, Bayside, Douglaston and Little Neck, Long Island, would be questioned soon on their desires with respect to the operation of the line. He said that the matter would be determined definitely by a questionnaire which would be sent out by the borough. At the meeting at which the city operation of the line was considered Grover Whalen, Commissioner of Plant and Structures, gave his opinion as to the trolley line, as compared with the bus line, saying that a modern bus line owned and operated by the city would be preferable.

Safety Behind Refusal to Operate— General Manager Clinton E. Morgan, in emphatically refusing to continue bridge operations when the city starts the municipal lines on the Williamsburg Bridge, contends that safety of operation is the motive behind his refusal. He points out that while the bridge is not used now to the point of saturation, another line, of the type Mr. Whalen proposes, would crowd the private cars off. He said his company wants to give all the service possible and to make the service satisfactory, but it wants to continue to be a safe service. The franchises of the Brooklyn City Railroad and the Brooklyn-Manhattan Transit Corporation do not require bridge operation, and since the city owns the bridge the commission cannot stop it from running cars on it. The city has had tied up in equipment for three years the sum of $600,000. In addition there has been a loss to the city of 5 per cent interest for three years on this sum, making the total amount of money lying idle for three years $690,000.

Financial and Corporate

Paris Expenses Exceed Receipts

With Its Subsidy, the Company Earns Profits and Pays 8½ per Cent on Its Capital Stock

All of the public transportation in Paris is conducted by the Société des Transports en Common de la Region Parisienne, which operates not only all of the tramways and buses, but one short suburban steam line and passenger boats on the Seine. On Dec. 31, 1922, the company operated on its electric tramways 1,818 electric motor cars and 861 trail cars; on its steam lines, nineteen locomotives, thirty-four passenger cars, ten baggage cars and 122 freight cars; on its bus lines 1,115 motor buses, and on its boat system, fifty-six motor passenger boats, two tugs and sixty-eight towboats. The annual report of the company for 1922, submitted June 26, 1923, indicated that on Jan. 1, 1923, the company had under course of construction to supplement this equipment sixty-seven electric motor cars of standard design and 250 light-weight motor cars, eighty-eight motor buses with four wheels and fifty motor buses with six wheels each, eight additional passenger boats and fifteen towboats.

Receipts from operation during 1922 amounted to nearly $21,000,000. Of this sum the electric cars brought in nearly 63 per cent and the motor buses nearly 35 per cent, leaving about 1 per cent for the steam railroad and boats combined and 1 per cent for miscellaneous operating revenue. During 1922 there was an increase of 5.1 per cent in passengers carried and of 10.8 per cent in operating revenue, as compared with 1921.

As has been described in previous issues, the company has a contract with the Department of the Seine, in which Paris is located, by which it operates these various means of transport under the direction of the department authorities. For this service it receives compensation, whether or not the operation of the system as a whole is profitable, and this compensation includes two premiums, known as the managing premium and the economy premium, varying in amount with the financial results obtained. As a net result the company earned a profit for the year, although the operating expenses exceeded the gross receipts. The accompanying tables are for the year ended Dec. 31, 1922.

There have been two increases in fare since Feb. 18, 1919. One was on April 1, 1920, the other on Jan. 19, 1922. Fares are on the zone basis, and the present tramway fares, expressed in centimes, are given in the accompanying table. One hundred centimes make a franc, and the rate of exchange for a franc has been assumed in this article as 7 cents. In the table of operating statistics below, the figures have been changed to miles and dollars. The other tables give francs.

PARIS TRAMWAY FARES IN CENTIMES

	First Class	Second Class
For the first zone	35 to 40	25
For two zones	55	40
For each succeeding zone after two	15	10

PROFIT AND LOSS ACCOUNT

Receipts of company (based on Article 23 of the franchise).

Interest at 6 per cent on the capital stock of Fr. 60,000,000	Fr. 3,600,000.00
Premium earned by managing bonus	2,425,158.09
Premium earned by economy bonus	3,166,177.39
	Fr. 9,191,335.48

The expenses chargeable to the company are fixed, according to Article 23 of the franchise.

Salaries, premiums, etc., to the operating management, remuneration to the directors and auditors, etc., amount to	Fr. 2,923,723.67
Second annual payment to amortize the guarantee fund	300,000.00
Total expenses	Fr. 3,223,723.67
Credit balance	5,967,611.81
	Fr. 9,191,335.48

OPERATING STATISTICS, PARIS TRAMWAY, OMNIBUS AND BOAT SYSTEM, FOR 1922

	Vehicle-Miles or Boat-Miles	Passengers	Total Receipts	Receipts in Cents per Vehicle-Mile
Tramways (Electric)	56,715,777	622,405,302	$13,348,512	23.4
(Steam)	669,707	1,780,563	74,865	1.1
Total for tramways	57,385,485	624,185,865	$13,348,512	23.3
Omnibuses, regular service	26,941,282	289,937,863	7,275,548	27.0
Special night service	63,794	206,579	21,557	33.8
Special theater service	1,267	1,705	179	14.0
Total for omnibuses	27,006,344	290,146,147	$7,297,284	27.0
Boats	356,283	3,391,311	143,423	40.3
Miscellaneous receipts from operation, such as excess charges, adjustments, etc.	.....	.....	9,780	....
Total	.....	.....	$20,799,000	....
Receipts for freight and miscellaneous transportation	.....	.....	195,335	....
Grand total	84,748,112	917,723,323	$20,993,335	24.8

DISPOSITION OF CREDIT BALANCE

Credit balance		Fr. 5,967,611.81
5 per cent to legal reserve	Fr. 298,380.59	
6 per cent interest on the capital stock	3,600,000.00	3,898,380.59
Balance after these payments		Fr. 2,069,231.22
15 per cent of this balance to board of directors, according to Article 43	Fr. 310,384.68	
2 per cent extra dividend on capital stock	1,200,000.00	1,510,384.68
Balance after these payments		Fr. 558,846.54
One-half to Department of Seine (according to Article 23)		279,423.27
Balance after this payment		Fr. 279,423.27
Surplus from 1921		29,664.59
Total		Fr. 309,087.86
½ per cent extra dividend on capital stock		300,000.00
Balance carried over to next year		Fr. 9,087.86

It will be seen that each share of capital stock received an interest payment of 6 per cent and a dividend payment of 2½ per cent.

OPERATING REPORT FOR 1922

Passenger operating revenues		Fr. 297,128,574.11
Freight and other miscellaneous operating revenues		2,790,503.85
Miscellaneous revenue (exclusive of interest on investments)		3,021,418.85
Interest on sinking and other funds		641,482.52
Total revenue		Fr. 303,581,979.33
Operating expenses		304,271,425.95
Deficit from operation		Fr. 689,446.62
Amounts payable to sinking fund and special war fund guaranteed by the Department of the Seine to the eight constituent companies, etc.		Fr. 40,250,000
Charges payable by the Department on new capital		2,350,187.88
Total fixed charges payable by the Department		Fr. 42,600,187.88
Remuneration to the company under the franchise		9,191,335.48
Total of these two items		Fr. 51,791,523.36
Deficit from operation (as given above)		689,446.62
Total deficit for year		Fr. 52,480,969.98

Way Being Cleared for Kansas City Reorganization

A payment of claims aggregating $125,000 against the Metropolitan Street Railway by the Kansas City Railways has been authorized by Judge Kimbrough Stone of the Federal court. This is the first blanket order for payment of claims which has been made. It is taken to mean that the receivers have accumulated surplus funds and that a reorganization may be effected soon. The company will pay 80 per cent of the claims of certificate holders against the old Metropolitan Street Railway.

Judge Stone postponed the hearing on other priority claims against the company until Nov. 15.

In the meantime, claimants could perfect an organization among themselves.

James E. Goodrich, attorney for the company, admitted that the note and bond holders of the company had discussed reorganization at a meeting in Chicago.

The bondholders maintain their claims should be settled first, while the personal injury claimants are fighting for priority of payment. Judge Stone gave claimants who had not yet appeared in court ten days to obtain judgments or go to trial.

Birmingham Company Seeks to Defer Nov. 1 Interest

The receivers of Birmingham Railway, Light & Power Company, Birmingham, Ala., are of the opinion that their cash resources between now and July 2, 1924, will not be sufficient to discharge all of the obligations which they will be called upon to meet by that date. Among these obligations are $787,000 in principal amount of underlying bonds which mature July 2, 1924. In consequence they have filed with the court a petition in which they recommend that the interest which falls due Nov. 1, 1923, on the refunding and extension mortgage 6 per cent gold bonds be not paid. The question of whether or not the interest due on Nov. 1 shall be paid will come before the United States District Court at Birmingham on Oct. 30.

In view of the situation created by this appeal to the court the holders of the refunding and extension mortgage bonds organized with L. Carroll Root, vice-president of Newman, Saunders & Company, Inc., New Orleans, La., as chairman. This committee has arranged to pay the Nov. 1, 1923, coupon on bonds deposited with it, either by purchase of said coupons or loans secured thereby without interest. It has just announced that more than a majority of the bonds outstanding have already been deposited with the committee. If 60 per cent or more of the bonds are deposited with the committee and the principal is due by declaration or otherwise, the committee says responsible parties have contracted to buy the deposited bonds on or before May 1, 1924, at a price sufficient to yield to depositors the principal of their bonds and 6 per cent interest from May 1, 1923, to the date of payment.

As indicated previously the receivers appealed to the court because of the fear of inability to meet obligations coming due soon. The road has been in the hands of the court under the direction of Lee C. Bradley and J. S. Pevear since Jan. 23, 1919. The receivers have recently made a contract with the city which it is believed will eliminate destructive jitney competition. The ordinance went into effect on Sept. 15. It reduces the cash fare from 8 cents to 7 cents. Under the contract the receivers are required to make extensions and improvements in the service which will require very substantial expenditures. In addition the receivers have substantial amounts of receivers' certificates and bills payable, which will mature on or before July 2, 1924.

Appeals for a $40,833,292 Assessment of United Railways

The United Railways of St. Louis has appealed to the State Board of Equalization to reduce the valuation of the company's property for taxing purposes 20 per cent under the rate-making valuation fixed by the Missouri Public Service Commission at approximately $52,000,000.

If the Board of Equalization would accept the suggestion to reduce the assessment 20 per cent, it will be fixed at approximately $42,000,000 for taxing purposes this year. The company in appearing before the commission contended the valuation for rate-making purposes should be approximately $70,000,000.

The combined properties of the United Railways last year were assessed at $47,756,000, while the State Tax Commission this year recommended a combined assessment of $46,767,000, including the Missouri Electric Company.

The company paid 9.4 per cent of its total gross income last year for taxes.

Plea for Greater Participation by Owners

S. W. Huff, president of the Third Avenue Railway, New York, N. Y., has addressed a letter to the holders of the 5 per cent adjustment bonds inviting them to vote on the company's policy. Bondholders, he pointed out, are entitled to the same voting privileges as stockholders whenever the interest on the bonds has not been paid. He says that a comparatively small number of holders of these bonds are availing themselves of this voting privilege and that the directors are anxious to have as large a number of the security holders of the property as possible vote at its annual meetings, either in person or by proxy.

Minority Report Filed on New York Railways Reorganization

Frank D. Pavey has filed with Judge Mayer at New York a minority report in which he outlines a plan for the reorganization of the New York Railways which he considers much more feasible than the one filed by the majority, referred to in detail in the ELECTRIC RAILWAY JOURNAL for Oct. 20, page 718. His suggestion as to the readjustment contemplates the organization of three operating railroad companies designated as the Broadway & Seventh Avenue Railroad, New York Crosstown Railways, Manhattan Street Railway and one non-operating company designated as the New York Railways Assets Realization Company.

Mr. Pavey says the purpose of this grouping is to put the railway end of the business in a position where it can fulfill its duties to the public; where it will no longer be open to attack upon the ground that it is highly overcapitalized and operated solely in the interest of security holders; where it will be in a position to protect the relative rights of the owners of the underlying securities, and where it will be in an advantageous position for sale to the city of New York in case plans for municipal ownership are ever made effective.

Mr. Pavey feels that the plan as proposed by the majority "perpetuates the method of operation which has brought the railways of that system to ruin and to the verge of extinction." It is his opinion that the public can be served better by a series of short lines than by the new company proposed. He thinks that the organization of three operating companies will tend to protect the system in general from the adverse effects of local changes in passenger traffic. It is Mr. Pavey's opinion that the receivership ought to be continued until the affairs of the lessor companies are adjusted. He says that the New York Railways is hopelessly bankrupt, not only in respect to the payment of its private debts, but also in respect to the performance of its public duties.

Security holders of some of the companies have organized to protest against the details of the plan rather than the plan itself.

Conspectus of Indexes for Oct., 1923

Compiled for Publication in this Paper by

Albert S. Richey
Electric Railway Engineer
Worcester, Mass.

	Latest	Month Ago	Year Ago	Since War High	Since War Low
Street Railway Fares* 1913 = 4.84	Oct. 1923 **6.95**	Sept. 1923 **6.95**	Oct. 1922 **7.00**	May 1921 **7.24**	May 1923 **6.88**
Street Railway Materials* 1913 = 100	Sept. 1923 **163**	Aug. 1923 **165**	Sept. 1922 **181**	Sept. 1920 **247**	Sept. 1921 **156**
Street Railway Wages* 1913 = 100	Oct. 1923 **218**	Sept. 1923 **215**	Oct. 1922 **208**	Sept. 1920 **232**	Apr. 1923 **207**
Steel—Unfilled Orders (Million Tons) 1913 = 5.91	Sept. 30 1923 **5.04**	Aug. 31 1923 **5.41**	Sept. 30 1922 **6.69**	July 31 1920 **11.12**	Feb. 28 1922 **4.14**
U.S. Bank Clearings Outside N. Y. City (Billions)	Sept. 1923 **13.90**	Aug. 1923 **13.90**	Sept. 1922 **13.41**	Mar. 1920 **18.54**	Feb. 1922 **10.65**
Business Failures Number	Sept 1923 **1,280**	Aug. 1923 **1,433**	Sept. 1922 **1,460**	Jan. 1922 **2,722**	Sept. 1923 **1,280**
Liabilities (millions)	**27.50**	**48.40**	**32.51**	**105.7**	**27.50**

	Latest	Month Ago	Year Ago	Since War High	Since War Low
Eng. News-Record Construction costs 1913 = 100	Oct. 1923 **220.3**	Sept. 1923 **221.5**	Oct. 1922 **188.6**	June 1920 **273.8**	Mar. 1922 **162.0**
U.S. Bur. Lab. Stat. Wholesale Commodities 1913 = 100	Sept. 1923 **154**	Aug. 1923 **150**	Sept. 1922 **153**	May 1920 **247**	Jan. 1922 **138**
Bradstreet's Wholesale Commodities 1913=9.21	Oct. 1 1923 **13.10**	Sept. 1 1923 **12.91**	Oct. 1 1922 **12.50**	Feb. 1 1920 **20.87**	June 1 1921 **10.62**
Dun's — Wholesale Commodities 1913 = 120.9	Oct. 1 1923 **190.8**	Sept. 1 1923 **188.0**	Oct. 1 1922 **175.6**	May 1 1920 **263.3**	July 1 1921 **159.8**
U.S. Bur. Lab. Stat. Retail food 1913 = 100	Sept. 1923 **149**	Aug. 1923 **146**	Sept. 1922 **140**	June 1920 **219**	Mar. 1922 **139**
Nat. Ind. Conf. Bd. Cost of living 1914 = 100	Sept. 1923 **153.4**	Aug. 1923 **161.6**	Sept. 1922 **155.6**	July 1920 **204.5**	Aug. 1922 **154.5**

*The three index numbers marked with an asterisk are computed by Mr. Richey, as follows: Fares index is average street railway fare in all United States cities with a population of 50,000 or over except New York City, and weighted according to population.

Street Railway Materials index is relative average price of materials (including fuel) used in street railway operation and maintenance, weighted according to average use of such materials. Wages index is relative average maximum hourly wage of motormen and conductors on 105 street and interurban railways in the United States, operating more than 100 passenger cars each, and weighted according to number of cars.

North Shore Stock Offered—Remarkable Earnings

Substantial increase in the business of the Chicago, North Shore & Milwaukee Railroad is shown in statements issued on Oct. 18 in connection with the first public offering of $1,500,000 of 7 per cent cumulative prior lien stock of the company. The earnings of the company for the twelve months ended Aug. 31, 1923, as made public in connection with the offer of the stock are as follows:

Operating revenue	$5,677,652
Operating expenses and taxes	4,540,741
Operating income	$1,136,821
Non-operating income	27,298
Gross income	$1,164,119
Fixed charges	504,516
Net income	$659,603

This statement shows that the sum required to pay the dividends on the new prior lien stock was earned more than six times.

The new stock offering is the first since the recent readjustment of the financial structure of the company. Capitalization of the company comprises a funded debt of $8,265,400 and authorized capital stock totaling $20,000,000. Of this $5,000,000 is 6 per cent preferred and $5,000,000 is common stock. This stock is already outstanding, but of the $10,000,000 of prior lien stock only $1,500,000 has thus far been offered.

The business of the North Shore line has quadrupled since 1916. The total operating revenue in 1922 was $5,007,951. The enormous growth of the merchandise dispatch business of the line is shown by the following revenue figures covering this branch of the business:

1916	$62,654
1917	105,572
1918	151,728
1919	219,396
1920	471,496
1921	477,896
1922	738,817

The number of revenue passengers carried last year was 15,204,758. The merchandise dispatch business totaled 355,183 tons.

Pamphlet on British Columbia Electric Railway

The British Columbia Electric Railway, serving Vancouver, New Westminster and Victoria, has just issued a booklet of forty pages, with maps, views and descriptive matter of the line and territory which it serves. The pamphlet is handsomely printed and gives a very good idea of the physical surroundings and of the nature of the business done by the property. Copies have been mailed to the stockholders, which number about 15,000, mostly in England. It is also being sent to a selected list of residents in the home territory of the company.

Although the pamphlet is not primarily statistical, some statistics are given, and those showing the traffic of the company during the last ten years are reproduced below:

TRAFFIC STATISTICS, BRITISH COLUMBIA ELECTRIC RAILWAY

	Passengers	Tons of Freight
1913	71,973,822	448,750
1914	63,494,023	343,944
1915	46,330,096	231,133
1916	43,021,790	218,065
1917	43,232,630	324,280
1918	52,853,373	365,830
1919	53,326,288	331,794
1920	66,411,030	430,931
1921	71,065,275	413,131
1922	69,314,667	321,081

The booklet is profusely and artistically illustrated. It was prepared for publication under the direction of J. Lightbody, who is in charge of all the company's publicity and advertising.

Time Extended for Pittsburgh Reorganization

The Public Service Commission of Pennsylvania has extended until Dec. 1 the date for the reorganization of the Pittsburgh Railways to become effective. The company presented the petition and no objection was presented by the city of Pittsburgh, which is a party to the new arrangement under which the company will operate. The master appointed by the Allegheny courts to make a report on the reorganization has reported as of Oct. 11. According to law, the master's findings must be advertised for thirty days before the court can make an order, and the further extension until Dec. 1 was sanctioned by the commission to meet this requirement.

Hearing on Denver Case Concluded

The hearing has been ended on the application of the Denver Tramway for a repeal of the 6-cent fare. Special master Henry A. Dubbs, who has been sitting in the case, will go over the entire evidence and arguments submitted.

Gerald Hughes, attorney for the tramway, closed the case on Oct. 14 by going over the evidence that the city submitted, especially the appraisal for the city made by Dr. Delos F. Wilcox.

Mr. Hughes said that from 1917 to date the Tramway had not earned anything net; that more than $2,000,000 had been used in betterments and asserted that the physical condition of the system and the service would show that vast improvements had been made. He added that for the city's attorneys to maintain that the tramway lines were losing heavily by natural depreciation was ridiculous as the system's condition would show.

Mr. Hughes answered the arguments of the city's attorneys as concerned franchises. James A. Marsh, for the city, has asserted that there was no perpetual franchise for the company, and Mr. Hughes called attention to the common use of the word "franchise" whereas the word "contract" should be used, and asserted that the company did claim perpetual rights to the use of the streets of the city for street cars.

$2,801,605 Balance After Preferred Dividends

Nesbitt, Thomson & Company, Montreal, are offering $1,000,000 of the 7 per cent cumulative preferred stock of the Illinois Power & Light Corporation, which took over the Illinois Traction Company and other properties. The stock is being offered at the market which is around 92½ bringing the yield to more than 7½ per cent.

A consolidated statement of earnings for the twelve months ended July 31, 1923, has been issued in connection with the issue. It shows:

Gross earnings	$26,973,032
Operating expenses, maintenance and taxes	18,422,770
Net earnings	$8,550,262
Annual interest on total outstanding funded debt	4,492,829
Balance for dividends and amortization	$4,057,433
Annual dividend requirements on 7 per cent cumulative preferred stock	1,255,828
Balance	$2,801,605

It is explained that about 70 per cent of the net earnings are derived from power and light.

Money Being Returned to Contributors

Hard luck seems to be pursuing the residents of the territory formerly served by the old Springfield, Troy & Piqua Traction Company operating between Springfield and Troy, Ohio. In the first place the effort failed which was made to secure subscriptions sufficient to keep the road in service and practically all the rails on the west end of the line have been taken up and shipped to the Huntington, W. Va., plant of the Schoenthal Company, Columbus, which purchased the property at its scrap value. As if these were not enough the subscribers who contributed to the fund to refinance the line are confronted with the problem of how best to get back the amount of their subscriptions. The money that had been raised was deposited in the Springfield National Bank, and just before the committee in charge decided to return the money to the various contributors, the bank was closed. Under the first dividend of 33⅓ per cent declared by the receiver, the committee received a portion of the money back and is now engaged in distributing it, but only 25 per cent is being paid to contributors, the difference between that and the bank dividend going to pay various expenses that have been incurred. Meantime, as noted previously practically all of the rails on the west end of the line are being removed.

Merger of Electric Subsidiaries Proposed.—The stockholders of the Public Service Electric Company, a subsidiary of the Public Service Corporation of New Jersey and United Electric Company of New Jersey, will meet on Nov. 5, to vote on ratifying a merger of the two companies. The Public Service Corporation of New Jersey owns nearly all the stock of both companies.

Fare Fund at Lowest Point in Toledo

Car riding in Toledo has taken an increase in October, which indicates that September, with its net deficit of $34,484 for the Community Traction Company, is apparently the bottom for the present year. For the first half of October gross revenue was $6,000 ahead of the same period last month. Gross revenue for September showed an increase of $815 over last year to a total of $301,421, but fixed charges have increased $22,984 and expenses increased $23,068 per month this year as compared with last. Wage increases account for a large part of the expense increase.

Daily average of revenue passengers was 158,598 in September, which shows a decrease from August, with a daily average riding of 161,349 revenue passengers.

Feeder bus operations accounted for a loss of about $455 during the month.

The fare stabilizing fund is now at $85,938. This is the lowest point it has reached since the Milner ordinance has been in effect.

Auction Sales in New York.—At the public auction rooms in New York on Oct. 24 there were no sales of electric railway securities.

New Director Named.—J. L. Perron was recently elected a director of the Montreal Tramways. In this capacity he succeeds J. W. McConnell.

Gold Bonds Offered.—Harris, Forbes & Company and Coffin & Burr, Inc., New York, are offering $6,000,000 Alabama Power Company first mortgage lien and refunding gold bonds, 6 per cent series. The issue is being placed at 99 and interest, to yield about 6.07 per cent.

Preferred Dividend Paid in Cash.—The directors of the American Electric Power Company, Philadelphia, have declared a quarterly dividend of 1¾ per cent on the preferred stock, payable in cash on Nov. 15 to holders of record Oct. 31. The company on Aug. 15 last paid the preferred dividend in preferred stock.

Bonds Offered.—The National City Company and Halsey, Stuart & Company are offering at 92½ and interest, to yield more than 6⅝ per cent, $2,000,000 of the Portland Railway, Light & Power Company first lien and refunding mortgage gold bonds, Series B, 6 per cent. The bonds are dated May 1, 1922, and are due May 1, 1947.

First Mortgage Issue Offered.—Harris, Forbes & Company, New York, N. Y., are offering $1,000,000 of the Iowa Railway & Light Company first and refunding (now first mortgage) twenty-year 5 per cent gold bonds. The bonds, offered at 93 and interest yielding more than 6 per cent, are dated Aug. 30, 1912, and are due Sept. 1, 1932.

Tells of Creditors' Claims.—General Lincoln C. Andrews, receiver of the New York & Queens County Railway, has informed creditors of the company, other than the holders of the first mortgage bonds, that he has in hand $8,010 or less to pay claims aggregating $7,227,017. They were also informed that this amount was liable for city and Federal taxes and for claims that might arise out of the litigation now under way. Two suits are now pending for the foreclosure of two mortgages held against the company each for $1,500,000.

Seeks Discontinuance.—The Sistersville Traction Company on Oct. 5 presented arguments before the Public Service Commission of West Virginia for the discontinuance of its railway service at New Martinsville. The company in asking for authority to discontinue such service in the city claimed that it was operating that part of its line at a loss.

Review of Merger Denied.—The Supreme Court refused on Oct. 22 to review the case in which it was sought to have it determine the effect of street railway consolidation in New York City by the New York Railways upon the lien held by the Irving Bank and the Columbia Trust Company in the form of a mortgage upon the property of the Columbus & Ninth Avenue Railroad, a part of the former consolidated company.

Income and Passengers Increase.—The Philadelphia Rapid Transit Company realized a net income of $1,404,027 for the nine months ending Sept. 30, 1923. This compares with $1,365,129 for the nine months period ended Sept. 30, a year ago. The total passengers carried from January through September of this year was 677,003,228 against 623,972,005 for the same nine months a year ago. The passenger revenue for the nine months of this year was $32,595,400 as compared with $30,645,611 for the nine months ended September, 1922.

City Not Satisfied with Revised Toronto Award.—The city of Toronto will appeal to the Privy Council against the award of the arbitrators to the Toronto Railway in connection with the city taking over the railway at the expiry of its franchise. The award was $11,188,500. The city appealed to the first divisions court against this amount, and the divisional court reduced it by $543,500, being the estimated value of certain street railway property which the city need not take over. This, however, is not satisfactory to the city, and the Board of Control agreed to carry the case to the Privy Council.

Railway Bid In.—T. M. Hayes, Huntington, assistant general manager of the Ohio Valley Electric Company, and John Smith, representing Martin & Smith, Catlettsburg, attorneys for the Catlettsburg Street Railway, bid in that property's franchise on Oct. 15. It was sold at the court house at public auction by C. P. Carpenter, city treasurer and special commissioner appointed to conduct the sale. There being no competitors in the bidding the franchise was knocked down at the first bid of $50. The franchise runs for twenty years.

Will Begin Repayment of Loans.—Having accumulated a cash balance of $301,191, the Seattle Municipal Railway is in a position to begin repayment of loans from various city funds, which were made to the railway two months ago, when it needed cash to meet its payrolls, after the 5-cent fare experiment had exhausted its funds. Superintendent D. W. Henderson recently informed the City Council of this fact. He suggested that loans of $100,000 from the city light fund and $75,000 from the water department, made July 24, be returned. The railway also borrowed from several railway special funds which have not yet been repaid.

Bridge Line Settling Accident Claims.—The balance sheet of the Manhattan Bridge Three-Cent Line, New York, as of June 30, last, shows surplus of $10,759; road and electric line, $147,326; equipment, $117,727; floating capital, $29,613; investments, $74,214; reserve, $100,421; unfunded debt, $31,096, and total assets and liabilities of $592,277. The report states that as a result of the serious accident on May 1, 1923, the reserves for accidents have been used up and before all claims are settled the surplus will be gone. The total amount paid out to Sept. 1, 1923, on account of this accident amounted to $34,593. The company has settled thirty-seven claims and there are seventeen still pending.

Research Bureau Reports on Finances. The Bureau of Government Research, in asking where the $120,000 is to come from for the increased wages recently put in effect on the lines of the San Francisco Municipal Railway, has published in the San Francisco *Chronicle* of Sept. 21 an itemized statement of the railway's income account for the fiscal year, ended June 30, 1923. The total revenue, according to the statement, was $3,013,552, with total operating expenses of $2,301,156. After the consideration of interest on funded debt and reserve for depreciation and account, the excess after all payments amounted to $23,050. The increase of 40 cents a day recently granted to the employees, or a daily salary of $5.40, would increase the expenses of the Municipal Railway $120,000 a year.

Time for Deposit of Saginaw Securities Extended.—Formal announcement was made in New York on Oct. 22 that the reorganization plan for the Saginaw Valley Traction Company, Saginaw, Mich., had been put into effect and the securities of the company are ready for distribution. The protective committee representing the first mortgage gold bonds of the company has extended the time limit for the deposit of bonds under the reorganization plan until Jan. 8, 1924. The committee, consisting of H. M. Addinsell, John R. Macomber and J. W. Hamer, stated that more than 95 per cent of the bonds had been deposited under the reorganization plan. As has been stated before in the ELECTRIC RAILWAY JOURNAL the new company, the Saginaw Transit Company, has acquired and is now engaged in rehabilitating the street railway properties in Saginaw.

Traffic and Transportation

Fare Case Before Court

Special Master Considering Arguments in Houston Fare Fight—Fare Increase Imperative

Hearing of the action brought by the Houston Electric Company against the city of Houston to prevent the city enforcing a 7-cent fare ordinance was begun in Federal court on Oct. 9, before Special Master Hunt. The city is represented by John A. Beeler, who has made a careful survey of the traction properties in Houston.

It was indicated early in the hearing that the company will ask for an 8½-cent fare, on the basis that the 7-cent fare fixed by the city is confiscatory and that a fare of 8½ cents is necessary to enable the company to meet operating costs and yield a fair return on its invested capital.

H. P. Gillette, editor of *Enginering and Contracting*, was the first witness presented by the traction company. He testified that the deficit on which the company based its petition was in the earnings, and not due to any mismanagement or lack of economical operation. The company, he said, is entitled to charge a fare that will enable it to meet its operating expenses, when the lines are economically administered, and to yield a fair return on the invested capital.

Net earnings of the company at present, Mr. Gillette said, constitute a confiscation of property, as the company's books show net earnings varying from one-half of 1 per cent to a maximum of 2¼ per cent of the investment during the last three years.

Estimated cost of reproducing the property of the company as of May 31, 1923, was given by Mr. Gillette as $7,601,588 minus depreciation, with true net earnings of $112,346, or, by the "sinking fund" method of calculation, an earning of only 1½ per cent of the invested capital.

Mr. Gillette then showed that the amount of the alleged deficit for the year ended May 31, 1923, divided by the number of fares collected in the preceding year, showed that to bring revenues up to a point where a fair return on the invested capital would be produced it would be necessary to add 1.7 cents.

The average fare paid in 1922 was 6.8 cents and the added 1.7 cents would produce a fare of 8½ cents.

Reproduction cost now is about 64 per cent higher than in 1914, counsel for the traction company stated to the court, explaining that in 1919 Judge Hutcheson of the Federal District Court allowed a reproduction cost about 33⅓ per cent higher than in 1914 and the Supreme Court had held that the Houston court did not err, although the company attacked this point in its suit.

C. J. Kirk, Public Service Commissioner of Houston, sought to prove that Stone & Webster are overpaid for the work which they do in supervising the operations of the company at Houston.

Service Increases Noted in Chicago

Twice recently Mayor Dever has commended the Chicago Surface Lines for improvements in service. With the installation of all day trailer service on Madison Street on Oct. 14, he again issued a public statement. Trains previously had been operated during rush hours only on other routes, but with the arrival of cars of sufficient motor capacity it became practicable to keep the two-car trains in all-day service. Madison Street is one of the heaviest arteries of travel in Chicago. Its complement now is eighty-nine motor and sixty-six trail cars for weekdays, service having been increased about 20 per cent. Results have been most encouraging to the company as the business continues to grow daily.

Cars in operation on the system have increased 220 since a year ago. Of the 214 new cars ordered some time ago, 184 have been placed in service. Besides, schedule revisions have added the equivalent of thirty-six more cars. Sixty other cars are being built. About 50 per cent of the schedules have been revised since Jan. 1, with the result that 1,525 round trips have been added daily, or more than 6 per cent gain on these changed routes.

Seeks Increased Fare in Oklahoma City

The Oklahoma Railway, operating in Oklahoma City, has asked for authority to increase its fares to 8 cents, and a committee of business men which investigated the financial condition of the company has recommended to the State Corporation Commission that the increase be granted.

John Shartel, general manager of the company, said that the 7-cent fare with four tokens for a quarter now charged is not sufficient to meet operating expenses and that unless relief is granted the company will be compelled to go out of business in Oklahoma City. The traffic has suffered greatly because of the increase in the number of automobiles, Mr. Shartel said.

The company operates interurban lines in three directions out of Oklahoma City and plans to electrify the steam railway from Oklahoma City to Shawnee. Mr. Shartel said that unless relief for the local situation in Oklahoma City is granted the electrification project would be dropped, at least for the present.

Bid for Co-operation

Saginaw Operator Seeks to Impress Business Men with Need for Their Help

"Your job did not end when you approved the franchise; in fact your job just started. From now on you have your biggest job, to help us to make the system all you want it to be, to give the kind of service you want.

"You have an ideal system here—the money supplied to you, and your own people directing the company. Try it, with the help of every man, woman and child in the community. We are at your service, and all we ask of you is patience and co-operation while we are working out the details."

These were the words with which Charles S. Kressler, president and general manager of the Saginaw Transit Company, concluded a speech which he made a few days ago before the members of the Exchange Club. Street railway service in Saginaw has been shut down for two years, and Mr. Kressler knows that he has a tough job ahead of him. He hopes to resume railway service on Nov. 15. The new buses are arriving and they, too will be placed in service soon. Mr. Kressler made no bones about the fact that his talk was a bid for support for the new enterprise. He said some things to business men that might well be repeated elsewhere. Mr. Kressler painted the picture with these words:

"When you consider the transportation problem in a city the size of Saginaw you realize that in a city of 60,000 to 200,000 people there are not enough people who do not own or cannot afford automobiles to support a transportation system properly. Where is the revenue coming from to pay the cost of operation?

"At present many of you get into your autos in the morning and after driving downtown park them in front of your places of business. That space does not belong to you. You should ride to and from your work on the transportation system.

"You are after the business of the farmers, but when the farmers find a place to park downtown they buy in nearby communities, instead of coming to the business center to trade. Within the past few years the business of the neighborhood stores has more than doubled because the people can't find places to park downtown. They buy nearer to their homes. Instead of coming to town frequently to buy, the farmer comes only when it is absolutely necessary.

"It is a merchandising problem, but it also has to do with transportation. I believe that if more attention were paid to that question it would mean proper support to the transit company as well as a profit to yourselves, the appreciation of the farmers and a whole lot better feeling in the community.

"If you drive your own car down to work and back twice a day it will cost you 40 to 60 cents a day, while you can ride on the street car the same number

of times for 25 cents. You can't afford to drive your own car when you have a good transportation system—and that is what we are trying to give you. In doing this we want your co-operation. In fact, we must have it if we are to succeed. It is as much your problem as it is ours."

Mr. Kressler expressed the need for greater care about safety, particularly in view of the fact that during the period the street cars were withdrawn autos were permitted to wander all over the streets.

Adopts Traffic Resolution in New Orleans

The Commission Council of New Orleans by a vote of four to one (Mayor McShane dissenting) adopted on Oct. 17 the resolution of Commissioner Paul H. Maloney of the Department of Public Utilities to open up North Rampart Street from Esplande to Elysian Fields.

The widening of North Rampart Street will cost approximately $500,000, one-half of which expense will be borne by the Public Service, Inc., and the other half by the city. In order to hasten the work of improvement the Public Service, Inc., has signified its willingness to advance the entire sum, to be reimbursed later by the city for its share of the expense. For this purpose, the resolution adopted directs the budget committee of the city to set aside $125,000 out of the budget of 1924 and a like sum out of the 1925 budget.

Commissioner Paul Maloney pointed out in his resolution that the annual yield from present grants to the Public Service Inc., together with that derived from an agreement made with the Cumberland Telephone & Telegraph Company, available for municipal improvements would be materially increased in 1924 and 1925 and that this should approximate the total cost of financing the project. The project contemplates widening the street for a lineal distance of 2,900 ft., and it is quite likely that work will be started soon and rushed through to completion.

A paragraph in the Beeler report on traffic conditions in the city points out the immense benefits to be derived from this work of improvement, "affording a great artery for all traffic to this important industrial center."

Salt Lake City Has New Interurban Station

The new interurban station for electric railroads of Salt Lake City was formally opened to the public on Oct. 4. Former Gov. Simon Bamberger, chairman of the board of directors of the Bamberger Electric Railway, with other officials of that road and of the Orem Electric Railway, were on hand. All officials were commissioned as ushers and guides. A thorough inspection of the structure was made by a large number of guests.

The big waiting room, which is 125 x 42 ft. in dimension, with a ceiling two stories high, was specially decorated and lighted for the occasion, and all other parts of the new building were in festive garb.

The building, which is the local terminal of the Bamberger and Orem lines, was constructed by the two electric roads at a cost of $300,000. The second story is divided into offices, including those of the traffic and operating departments of the two roads. On the first floor the waiting room and ticket office, which are handsomely finished in marble and tile, occupy the central position, while at the south end of the building there are offices and stores facing the street.

The Bamberger Electric line was started in 1890 by its present head. It was built as far as Lagoon in 1895 and into Ogden in 1908 and was electrified in 1910. The Orem electric line was started in 1911 and completed as far as Payson, Utah, about three years later.

Railway Station and Office Building at Salt Lake Adds Greatly to City's Attractiveness

Expedites Freight Deliveries

The electric lines play an important part in a campaign for better and more rapid and efficient freight service to towns and cities served by Fort Wayne jobbers and shippers. In a systematic effort to expedite shipments and provide "next morning deliveries" to towns in this territory, the traffic and transportation bureau of the Chamber of Commerce, in co-operation with the Fort Wayne Traffic Bureau, has arranged a schedule to provide rapid service over the electric railways to points between Fort Wayne and Lafayette, Ind., on the south, and Warsaw, Goshen and South Bend, Ind., on the west. The schedule, it is announced, will make possible next morning deliveries to points south, as well as at Warsaw and Goshen, with noon deliveries at South Bend. Freight destined for this service may be delivered at the electric railway freight terminal up to 4 o'clock in the afternoon.

Wyandotte Division of Detroit United Reopened

Interurban service was resumed on Oct. 20 on the Wyandotte division of the Detroit United Railway. The road has been shut down since August, when the city of River Rouge obtained an injunction restraining the company from operating through that municipality. The injunction was issued when the railway company attempted to increase fares.

The resumption of service was the result of an order issued by Judge Henry A. Mandell in the Circuit Court directing the railway to sign bonds for $25,000 pending the outcome of litigation started by the township of Ecorse, one of the down-river communities served by the Wyandotte division.

Plans for resuming car service between Detroit, River Rouge, Ecorse, Wyandotte, Riverview, Sibley and Trenton were about completed when a new barrier was raised by the Ecorse Township Board. It was claimed by the board that the railway owed more than $20,000 as the company's share of the expense of a bridge connecting Ecorse and Wyandotte. Ecorse backed up its claims by nailing planks across the company's tracks on the bridge and guarding the bridge.

The bridge was erected about eight years ago and it was claimed by the Ecorse officials that at the time the bridge was built the work was done with the understanding that a friendly suit was to be started against the railway to determine what proportion of the cost should be paid by the company. The suit, it is claimed, was never called, and Ecorse officials refused to accept settlement offered by the company. The question was raised as to whether the company was legally bound to pay anything toward the expense of the bridge, the contention being made that the claim was outlawed according to the statute of limitations.

Report on Louisville Fund After Jan. 1

Charles Roser, auditor of the Public Utilities Bureau of Louisville, stated that there would be no report issued on the barometer fund of the Louisville Railway until some time after Jan. 1. Because of several questions about the matter, he has explained the working fund and the chances for a lower fare for Louisville citizens in the future. Mr. Roser said that under the ordinance providing for the barometer fund the Louisville Railway created a cash fund of $350,000 on Jan. 1, 1923, so that computation was based on that amount. If at the end of any operating period the fund exceeded $500,000 the fares were to be decreased. When the barometer fund reached $500,000 the public should get the first benefit in the reduction of fares.

He said that the report would be made some time after Jan. 1, 1924, as the period on which this report will be based ends Dec. 31, 1923. He said also the stockholders of the railway would get the benefit of an increase in the barometer by a rate of return on the common stock. When the barometer fund exceeded $500,000 he said that the excess would be withdrawn and one-third of the excess paid into the city treasury, one-third to the company to be distributed among its employees and one-third retained by the company as corporate funds.

Six-Cent Fare Extended.—The City Council of Richmond has extended the 6-cent fare on the lines of the Virginia Railway & Power Company for six months. The company began operating under the extended privilege on Oct. 11.

Eight-Cent Fare Asked in Tulsa.—The Tulsa Street Railway, Tulsa, Okla., reports to the Corporation Commission an operating loss of $15,910 in the first seven months of 1923, $4,407.61 of which was incurred during July. An 8-cent fare is asked.

Fares to Be Advanced.—Fares in Iowa City will be advanced to 7 cents. The Mississippi Valley Electric Company announced that it can no longer afford to operate on a 5-cent fare. Local bus lines also will increase their fares. Car and bus tickets will be sold at the rate of four trips for a quarter.

Will Extend Freight Service.—Wide extensions in freight service on the Tiffin & Fostoria Railway, Tiffin, Ohio, line are soon to be put into effect. Through freight service from Tiffin to Cleveland went into effect on Sept. 20 and through service to Dayton and Cincinnati will be put into operation soon.

Ride for One Cent.—The Danville Traction & Power Company, Danville, Va., designated Sunday, Sept. 30, as "1-cent fare day." On that day the public was allowed to ride on any street car for 1 cent. The purpose was to give the patrons an opportunity to inspect five new double-truck cars which were put in operation on that day.

One-Man Cars Up to Voters.—Plans are being made by local labor unions of Sacramento to place on the ballot at the coming municipal election in November a measure pertaining to one-man car service. Conferences were arranged recently by the city at which were present officials of the Pacific Gas & Electric Company and representatives of the local labor unions.

Wants to Operate a Bus Line.—The Pennsylvania & New Jersey Railway has filed with the Trenton City Commission a petition to establish a bus line that will operate between Trenton, N. J., and Morrisville, Pa., in co-operation with the present electric railway service. The company wants to establish a terminus in the center of Trenton and run buses over the Delaware River bridge. The fare will be the same as charged by the railway, with transfer privileges to the trolley company.

Commission Protects Railway from Competition.—The Corporation Commission of Oklahoma has denied the application of J. E. Clark for a certificate of public convenience and necessity to operate a motor vehicle between Muskogee and Fort Gibson. In so doing the commission sustains the protest of the Muskogee Electric Traction Company, which stated that it now furnishes a full and complete service to passengers between those points, and that no necessity existed for additional transportation service.

Keeps Way Clean.—An effective remedy has been found by the Rockford & Interurban Railway, Rockford, Ill., for keeping the right of way free from weeds, grass, etc., in an improvised mower, hooked on behind the trolley car. The attached mower is fitted with standard wheel equipment, a seat is attached for the operator and two scythes are placed in wing fashion on the right and left side of the rails, the trolley car in front pulling the mower. The mower is similar to the one described in the ELECTRIC RAILWAY JOURNAL for Oct. 6, page 569.

Bus-Trolley Service.—A contract has been let by the Monongahela-West Penn Public Service Company as a preliminary to operating a bus service between Rivesville and Morgantown, W. Va. It will be possible for persons desiring to make the trip between Fairmont and Morgantown to obtain a combination ticket that may be detached for carfare on the trolley cars between Fairmont and Rivesville or Rivesville and Fairmont, so that the fare between Morgantown and Fairmont will be 91 cents. All buses will be met at Rivesville by cars of the Monongahela-West Penn Public Service Company.

Will Continue Through Business Center.—According to an order of Edwin M. Walker, president of the Schenectady Railway, service on the Albany-Schenectady interurban line will continue through the business district of Albany and turn at the Fulton Street loop, as a means of accommodating merchants and shoppers. Heretofore all local Albany cars turned at the waiting room, but it was found out following the traffic survey that the continuation of the schedule to include the downtown district was more than warranted. Mr. Walker in announcing the change said he believed that the interests of the public and those of the company were mutual and that he thought the new plan would prove popular generally.

City Bus Line in Prospect.—A municipal bus line is to be established in West Seattle, between the end of the Alki car line and Lincoln Beach. A citizens' committee is to raise $4,500 of the purchase price of a bus, estimated at $7,000, and the Seattle Municipal Railway will then buy the bus and operate it. According to an opinion of Walter B. Beals, assistant corporation counsel, sent to D. W. Henderson, superintendent of railways, the Municipal Railway is not empowered to establish automobile bus service under the local improvement district plan of financing street railway extensions, authorized by the 1923 Legislature.

Safety Assured.—The Tennessee Legislature recently passed an act to insure the public safety at all grade crossings of interurban railroads (outside of the limits of corporate municipalities) on all highways in Tennessee now designated by the State Highway Department as main traveled ways and incorporated in the general highway plan of the State. Under House bill No. 122, Acts of 1923, all interurban trains either freight or passenger, must come to a full stop 25 ft. before all grade crossings in the state and shall not proceed until track is clear of vehicles and pedestrians. The railroads cannot rely on the defense of contributory negligence on the part of person or persons injured or owning the property damaged. Violation of the above act is a misdemeanor punishable by a fine of not less than $25 or more than a $100 or by fine of not less than thirty days.

Commission Seeks Solution.—The Traffic Commission of Los Angeles has asked a committee of engineers to furnish it its joint opinion as to what form of subway construction should be adopted to solve the city's traffic congestion problems. The question is whether to adopt a subway system with a central terminal station, a loop system or a diffusive distribution of subway stations. The committee to decide the question is composed of Richard Sachse, street railway expert; Samuel Starrow, nationally known consulting engineer; Franklin D. Howell, public utility expert and chief engineer of the Motor Transit Company of Los Angeles; H. Z. Osborne, formerly chief engineer, Los Angeles Board of Public Utilities, and Alvaro Pratt, subdivision and traffic engineer. The Pacific Electric and Los Angeles Railways, operating the local street car lines serving Los Angeles, have each prepared tentative plans of a proposed subway system.

Personal Items

C. L. Crabbs Retires from Brooklyn-Manhattan

C. L. Crabbs, for seventeen years in the way and structure department of the Brooklyn Rapid Transit System, has resigned as chief engineer of way and structure. Mr. Crabbs has been one of the department heads of the Brooklyn Rapid Transit System since 1909. He joined the organization in 1906 as principal assistant engineer in the way and structure department, when W. S. Menden was chief engineer. Prior to this connection he had been associated with Mr. Menden in engineering work in Chicago during the construction of the Metropolitan West Side Elevated Railway. In 1909, when Mr. Menden was appointed general superintendent of the Brooklyn Rapid Transit System, Mr. Crabbs was promoted to the position of engineer way and structure, and on Jan. 1, 1920, was appointed chief engineer way and structure.

His engineering career began in Chicago in the employ of General William Sooy Smith, and in May, 1892, he joined the staff of engineers engaged in the construction of the Metropolitan West Side Elevated Railway in Chicago. When the "L" construction work was completed, Mr. Crabbs resigned and in 1897 entered the Chicago civil service, first as construction engineer on the Hyde Park sewer system and later as engineer in charge of tunnel construction for the city's water supply system. From 1900 to 1906 he was engaged in the construction of a dock and terminal project along the Hudson River waterfront in Manhattan, and also did some supervisory work in connection with the construction of a factory in Moline, Ill.

Mr. Crabbs was born in Decatur, Ind. He studied engineering at the University of Illinois, from which he was graduated in 1890 with the degree of B S. in civil engineering. He will establish his home in Florida. On Sept. 26 members of his department presented Mr. Crabbs with a gold watch and chain.

Mortimer E. Cooley Resigns Presidency of Engineering Council

Mortimer E. Cooley, dean of the College of Engineering and Architecture of the University of Michigan, has resigned as president of the American Engineering Council of the Federated American Engineering Societies. In presenting his resignation Dean Cooley said that he retires on account of ill health. He also made it known that he has been granted leave of absence by the university for the second half of the academic year of 1923-1924. With his retirement as principal executive of the Engineering Federation Dean Cooley rounds out a career of almost half a century in the service of the state, of education and of his profession. Dean Cooley's successor will be formally chosen at the annual meeting of the American Engineering Council, in Washington, D. C., early in January.

Henry F. Merker Appointed Head of B.M.T. Way and Structure

Henry F. Merker has been appointed engineer of way and structure of the surface lines of the Brooklyn-Manhattan Transit Corporation, successor to the Brooklyn Rapid Transit Company, and has direct charge of all work of the way and structure department on the properties of the surface companies. Mr. Merker goes to Brooklyn from St. Louis, where he was construction engineer for the Missouri Rolling Mill Corporation for about two years. For a similar period he held the position of field engineer for the St. Louis Coke & Chemical Company at Granite City, Ill. From 1905 to 1919 he was engineer of maintenance of way for the East St. Louis & Suburban Railway.

H. F. Merker

Mr. Merker was born in Belleville, Ill. He was graduated from the University of Illinois in 1898. Prior to his joining the staff of the East St. Louis Railway, he was city engineer of Belleville, engineer in charge of power plants at Muskogee and Enid, Okla., and also served on the engineering staff of the Illinois Central Railroad and the Terminal Railroad Association of St. Louis.

Henry J. Kolb has been made engineer of way and structure, New York Rapid Transit Corporation, with direct charge of the way and structure department work on the rapid transit lines and for the South Brooklyn Railway. He has been connected with the engineering department of the system since 1904. In March, 1913, he was appointed engineer of design of the New York Municipal Railway in connection with the carrying out of the construction work under the dual subway contracts with the city of New York. In 1919 he was appointed engineer of construction in charge of engineering design and construction and in January, 1920, was appointed assistant chief engineer way and structure.

Mr. Kolb received his technical education in the Massachusetts Institute of Technology. He has been connected with the maintenance of way department of the New York, New Haven & Hartford Railroad at Boston; has been identified with the Kansas City, Mexico & Orient Railway, Chihuahua, Mexico, and has been associated with the Pennsylvania Steel Company at Steelton, Pa. He was employed two years prior to May, 1904, as a designing engineer by the New York Central Railroad on the design of the engineering track arrangement of the Grand Central Terminal improvements in New York City.

Harry W. Cushman has been appointed transportation superintendent of the Saginaw Transit Company. He has held the position of assistant superintendent with the Tri-City Railway of Davenport. Mr. Cushman was honored by Davenport railway employees with a farewell party, at which a handsome gold watch was presented to him.

Raymond C. Lenahan has been appointed general manager of the Buffalo & Lackawanna Traction Company, Buffalo, N. Y., to succeed Nelson H. Brown, resigned. Mr. Lenahan was general manager of the Depew & Lancaster Railway, operating a short interurban line from Buffalo to Cheektowaga, Depew and Lancaster. He has resigned as manager of this line, but still retains his place on the board of directors.

M. T. Montgomery has resigned as superintendent of transportation for the Steubenville, East Liverpool & Beaver Valley Traction Company, East Liverpool, Ohio, effective Nov. 1. Mr. Montgomery was formerly general superintendent of the Atlantic & Suburban Railway at Atlantic City, N. J. Prior to that he held executive places with the Pittsburgh Railways, was superintendent of a traction line in Mexico City and later manager of a railway at Monterey, Mexico.

H. F. Cameron, who has been serving as manager of the Arkadelphia-Malvern district since C. P. Couch was transferred to the active vice-presidency of the Mississippi Power & Light Company, at Jackson, Miss., has resumed his position as new business manager. J. E. Couch has been made manager of the Arkadelphia-Malvern district. He was formerly with the Southwestern General Electric Company in Texas, and has had years of experience in the industry.

C. E. Blee has been appointed chief assistant to E. E. Carpenter, recently appointed consulting engineer of the British Columbia Electric Railway in Vancouver. Mr. Blee has worked on the construction of the Copco dam of the California Oregon Power Company, being with that company since 1916, with the exception of a year when he served as assistant professor in the department of civil engineering at Stanford University. He was assistant engineer of the California Oregon Power Company at the time of his recent appointment.

M. R. Frederickson, who has been in charge of the Wisconsin Valley Electric Company at Tomahawk as division manager for the last few years, has been promoted to take over the duties of commercial manager of the company at Wausau. He will be succeeded at Tomahawk by Ralph Lillie, who has been in charge of the purchasing department of the company for many years. In his new capacity Mr. Frederickson, will succeed E. V. Pryor, former commercial manager of the company, who resigned to become connected with the Altofer Brothers Company of Oakland, manufacturers of the A.B.C. electric washing machine. The Wisconsin Valley Electric Company owns and operates extensive electric railway properties in the north central part of Wisconsin.

L. B. West has resigned as auditor of the Pine Bluff Company. Early in the present year when Mr. Longino was made manager Mr. West relieved him of some of the details of this office. Mr. West has been identified with the Arkansas Company for several years. He was a member of the Arkansas force when the properties were acquired from Ford, Bacon & Davis. When Byron C. Fowles, secretary-treasurer, general superintendent and purchasing agent of the Pine Bluff Company, resigned to become general manager of the public utilities in Kingsport, Tenn., in 1917 Mr. West went to Kingsport with him, and when Mr. Fowles returned to Arkansas Mr. West also returned and was made auditor. He plans to leave shortly for the west.

A. R. Delo has been appointed line foreman on the lines of the Beaver Valley Traction Company and the Pittsburgh & Beaver Street Railway, Pittsburgh, Pa. He was recently with the Duquesne Light Company for a period of two years, having previously served as line foreman with the Citizens Light, Power & Traction Company, Oil City during the years from 1900 to 1906. In the latter year he served in a similar capacity with the Franklin Electric Company, and remained there until 1915, at which time he entered the services of the Ridgeway Electric Company at Ridgeway, Pa. He left the latter concern in 1921 to become associated with the Duquesne Light Company. Mr. Delo succeeds John J. Tesh, who resigned as line foreman after having served the company for nine years.

T. J. Lucas

T. J. Lucas and E. S. Hight New Illinois Power Appointees

Two important appointments to the official roster of the Illinois Power & Light Corporation were announced recently by William A. Baehr, vice-president and general manager.

Thomas J. Lucas, electrical and gas engineer of many years' experience and widely known in the public utilities field, was appointed chief engineer, and E. S. Hight, electrical engineer, was made general operating engineer of the big corporation. The headquarters of both will be at Chicago.

For the last fourteen years Mr. Lucas has been associated with the William A. Baehr organization, consulting engineers, Chicago. He has been active in the direction of the engineering work of the Illinois Power & Light Corporation since the organization of this company on June 1, this year, formed by the consolidation of numerous public utility companies of the Middle West, among them the Illinois Traction System.

Mr. Hight is an engineer well known in the field in Illinois. For a number of years he was chief operating engineer of the Illinois Traction Company, with headquarters at Peoria, Ill. He will finish construction of the Topeka, Kan., power house, the transmission line from Topeka to Atchison and the construction work under way at the Venice, Ill., power house, properties of the Illinois Power & Light Corporation, and will also be responsible for efficiency and operation of the various power plants of the company.

E. S. Hight

Obituary

Charles P. Steinmetz

Dr. Charles Proteus Steinmetz, chief consulting engineer of the General Electric Company, died at Schenectady on Oct. 26, after a very brief illness. Dr. Steinmetz was taken sick during a recent visit which he made to the Far West, and although he recovered sufficiently to make the return trip to the East, the attack of illness which he suffered in the west proved fatal because of the patient's lowered resistance.

Dr. Steinmetz was an engineer-scientist whose gifted genius was widely reflected in electrical and chemical experimentation, research and design. His ability was recognized everywhere, and on old and new problems alike his opinions were eagerly sought. His most constructive work was done, perhaps, in connection with the development of alternating current motors, generators, converters, regulators, lighting and the like. His contributions to the advancement of electrical science and indirectly to humanity will probably never be fully appraised.

Dr. Steinmetz was born April 9, 1865, at Breslau, Germany. He was educated at the Breslau gymnasium and university, studying mathematics, astronomy, physics, chemistry and other branches including economics. In Switzerland he studied mechanical engineering at the Polytechnicum of Zurich. In 1889 he came to America and secured a position with the Eickemeyer Manufacturing Company, first as draftsman then as electrical engineer and designer, and finally on research work in charge of the Eickemeyer laboratory. With the absorption of the Eickemeyer interests by the General Electric Company, Dr. Steinmetz was attached to H. F. Parshall's calculating department in Lynn, Mass. When the company's headquarters were transferred to Schenectady, N. Y., in the spring of 1894, he organized and took charge of the calculation and design of the company's apparatus and of the research and development work. Since 1902 he has been professor of Electrical Engineering at Union University, at the same time retaining his connection with the General Electric Company as consulting engineer, organizing and assuming charge of its consulting electrical department in 1911.

Dr. Steinmetz was a fellow of the American Association for the Advancement of Science, a member of the Mathematical Society and of the Physical Society. He was a past president and member of the American Institute of Electrical Engineers. He was the author of more than a score of books and of numerous scientific papers.

Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

Small Increase in Use of Wood Preservatives

There has been a relatively small gain in the total amount of timber treated in the United States during the past ten years, according to data compiled by the United States Forest Service, in co-operation with the American Wood Preservers' Association. The total for 1913 was 156,613,888 cu.ft., while that for 1922 was 166,620,347 cu.ft., an increase of only a little more than 6 per cent. During the same period the number of treating plants increased from 93 to 128, or more than 36 per cent. The figures show a decided falling off in 1922 over 1921, in which year there was treated a total of 201,643,228 cu.ft. This was probably due to financial retrenchments on the part of the railroads, the car shortage and the coal situation.

The number of ties treated in 1913 was 40,260,416, as commpared with 41,316,474 in 1922, although 55,383,515 were treated in 1921. On the other hand, only 142,069 poles were treated in 1913, as compared with 966,400 in 1922, and there was also a decided increase in the extent of treatment of structural timbers, 138,843,536 ft. B.M. having been treated in 1913, as compared with 152,556,960 ft. B.M. in 1922. Of the ties treated in 1922, nearly 50 per cent were treated with creosote and about 42 per cent with zinc chloride, while the balance were mostly treated with a mixture of zinc chloride and creosote. The total consumption of creosote oil decreased from 108,373,359 gallons in 1913, of which 2,165,736 gallons, or 4 per cent, were imported, to 86,321,389 gallons in 1922, of which 35,462,238 gallons, or 41 per cent, were imported. Zinc chloride, on the other hand, showed an increase in consumption from 26,466,803 lb. in 1913 to 29,868,639 lb. in 1922, the figure for 1921 having been as high as 51,375,360 lb. This indicates a very marked increase in the extent of the use of zinc chloride as a preservative, either alone or in combination with creosote or other preservatives.

Westinghouse Shows Gain

Orders of the Westinghouse Electric & Manufacturing Company for the quarter ended Sept. 30 amounted to $41,940,000, compared with $37,453,000 for the corresponding period last year and $47,649,000 for the quarter ended June 30, 1923. Sales billed for the three months ended Sept. 30 were $38,619,500, against $30,291,800 in the 1922 period and $35,094,800 in the first quarter of this year ended June 30.

For the first half of its fiscal year Westinghouse booked $89,589,100 new business, an increase of 28.8 per cent over the corresponding 1922 period. Total incoming orders for last year were $152,328,564. Billings for the half year amounted to $73,714,300, topping 1922 by 31.6 per cent.

Lumber Specifications Available

Recommendations from the Department of Agriculture for the standardization of grading specifications for yard lumber and for structural timbers will soon be available in circular form. Distribution of the circulars will probably be from the Forest Products Laboratory at Madison, Wis. The first editions, consisting of a few thousands each, will be distributed free on request as long as the supply lasts. In order to make the distribution as effective as possible, the laboratory will give priority to all direct requests received now, before the circulars are sent out to its general mailing list.

World Production of Coal, January-June, 1923

A summary of the data received by the United States Geological Survey up to Oct. 15 shows a total of approximately 666,000,000 tons of coal produced during the first half of 1923. This is an increase of about 79,400,000 tons, or 13.3 per cent, over the corresponding period of last year. Nearly all the countries listed have increased their production, the most notable increases being in the United States, United Kingdom and Poland. The proportion contributed by the United States was 44 per cent of the total. The accompanying table gives the figures.

PRODUCTION OF COAL IN PRINCIPAL COUNTRIES OF THE WORLD, JANUARY-JUNE, 1923.

(In metric tons of 2,204,622 lbs.)

Country	Metric Tons	Per Cent of Total
North America:		
Canada	7,912,610	1.19
United States	294,261,000	44.18
Europe:		
Austria: Coal	74,698	.01
Lignite	1,242,196	.19
Belgium	11,127,700	1.67
Czechoslovakia: Coal	5,919,835	.88
Lignite	8,725,861	1.31
France: Coal	17,659,350	2.65
Lignite	433,741	.06
Hungary	3,807,521	.45
Netherlands	2,686,246	.40
Poland	21,680,056	3.25
Russia	5,609,000	.84
United Kingdom	143,051,102	21.50
Asia:		
British India	10,074,000	1.51
Japan	13,745,000	2.06
Africa:		
Rhodesia	250,447	.04
Union of South Africa	5,222,674	.78
Total	666,000,000*	100.00*

* Germany, South American countries and others not shown individually are included in the total.

Electrification Progress in Mexico

Orders have been placed with the International General Electric Company for an 11,250-kva., 4,000-volt waterwheel generator to furnish power for the electrification of the Maltrata Incline of the Mexican Railways, contract for which was let to this company recently. More than 50,000 kva. in water-cooled 60-cycle transformers designed for 42,000 volts primary are also included in this order. This is the second important step in beginning electrification. Shipment has been completed from Schenectady and Erie of the overhead line equipment, including trolley wire, feeder hangers, etc.

The 3,000-kw., 3,000-volt motor-generator sets for the substation to be located near the center of the electric division will be the largest ever constructed for this voltage. These are now being assembled for test, while the locomotives are themselves nearing completion at the company's Erie works.

General Electric Will Buy the Canadian General Electric

The directors of the Canadian General Electric Company have unanimously approved the offer made by the General Electric Company for the purchase of the stock of the first-mentioned Company. It appears that only the formal ratification by the stockholders is necessary to consummate the agreement.

A question has been raised in regard to the probable disposition of the subsidiary companies in Canada, particularly the Allis-Chalmers Company, which has factories at Toronto, Montreal, Bridgeburg and Stratford. These plants were greatly expanded during the war, but recently have been unprofitable.

The Canadian General Electric Company has an authorized capitalization of $18,000,000 of common stock, of which $10,800,000 is outstanding. There is also $2,000,000 of 7 per cent cumulative preferred stock outstanding. It is thought likely that the agreement will include a stock conversion feature. In order to give the stockholders ample time to consider the offer special stockholders' meetings will probably not be held before the latter part of this year.

Metal, Coal and Material Prices

Metals—New York	Oct. 23, 1923
Copper, electrolytic, cents per lb.	12.687
Copper wire base, cents per lb.	15.25
Lead, cents per lb.	6.85
Zinc, cents per lb.	6.65
Tin, Straits, cents per lb.	41.125
Bituminous Coal, f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$4.575
Somerset mine run, Boston, net tons	2.25
Pittsburgh mine run, Pittsburgh, net tons	1.875
Franklin, Ill., screenings, Chicago, net tons	1.45
Central, Ill., screenings, Chicago, net tons	.925
Kansas screenings, Kansas City, net tons	2.25
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft.	$6.60
Weatherproof wire base, N. Y., cents per lb.	18.00
Cement, Chicago net prices, without bags	$2.20
Linseed oil (5-bbl. lots), N. Y., per gal.	$0.95
White lead, in oil (100-lb. keg), N. Y., cents per lb., carload lots	11.25
Turpentine, (bbl. lots), N. Y., per gal.	$0.99

Rolling Stock

Long Island Railroad, New York, N. Y., has placed the contract for motors and control apparatus for sixty new cars with the Westinghouse Electric & Manufacturing Company. Each car will be equipped with two 225-hp. motors arranged for multiple-unit control. This new equipment, which involves approximately $600,000, was referred to in the ELECTRIC RAILWAY JOURNAL, issue of Sept. 22, 1923.

Track and Line

Northern Texas Traction Company, Fort Worth, Tex., has completed a feeder line to supply current for operation of cars on the Seminary Hill Line.

Los Angeles Railway, has started work on reconstructing the West Forty-eighth Street track between Gramercy and Van Ness. The reconstruction of Hill Street from Fourth to Eighth has been completed.

Saginaw Transit Company has placed track orders for March 1 delivery. The company will then proceed with replacements which have been ready for the junk yards for many months.

Tama & Toledo Railroad, Toledo, Iowa, is tearing up its old rails at Toledo and is replacing them with heavy steel. The rails are being welded. Concrete and cement filling is being put in at the end of the ties instead of the old brick.

Connecticut Company is ready to double track the construction through Capitol Avenue in co-operation with the city betterment project of widening that street. The Capitol Avenue widening calls for widening the thoroughfare from Main Street to Trinity Street.

Harrisburg Railways has completed construction of work on North Cameron Street between Calder and Maclay Streets. Construction extends for a distance of 2,850 ft. and costs the company approximately $30,000. The work was accomplished within twenty days.

Dallas Railway has been granted a requisition for construction of the new line in Oak Cliff. The new line will begin at Tyler Street and Jefferson Avenue, extending southward along Tyler Street to Burlington Boulevard, westward along Burlington Boulevard to Waverley Drive. The cost of the new line is estimated at $200,000.

New York State Railways has applied to the Public Service Commission for permission to build and operate a single track extension of its lines from the present terminal in Salina along the Syracuse-Bridgeport highway, a distance of 2,200 ft., thereby forming a loop. The extension is to afford transportation facilities to a large factory about to be constructed along the company's lines.

Wilkes-Barre Railway will install new double tracks on West Market Street from the Public Square to River Street, just as soon as the Goeringer Company has the street in readiness for the work. After the double-tracking is done, the street will be repaved with sheet asphalt. The work will be rushed with all possible haste. With the new improvement will come the removal of all poles and wires.

Kansas City, Clay County & St. Joseph Railway, Jefferson City, Mo., will pay $7,304 of the cost of an overhead crossing on the State Road from Liberty to Excelsior Springs. This is in accordance with an order previously issued by the Public Service Commission requiring the company to pay one-half of the estimated cost. The total project is estimated at $14,608. The bridge will be constructed under the direction of the Highway Commission.

Birmingham Railway, Light & Power Company, Birmingham, Ala., has placed an order with the Buda Company for special trackwork layout to be installed at the railway's carhouse at Third Avenue, Tenth and Eleventh Streets, Birmingham. This layout consists of fifty-five branchoffs, and is probably the largest single layout purchased in the southeast for a number of years. Construction is to be of the new A.E.R.E.A. 7-in. guard rail with solid manganese switches.

New York, N. Y.—The Transit Commission will receive bids on four important rapid transit contracts on Nov. 2, constituting the largest amount of contract work upon any one occasion since the time of the construction of the dual system of rapid transit. Two of the contracts cover the construction of a portion of the Flushing extension of the Corona branch of the Queensboro subway. A third contract calls for the removal of the kiosks which block the curb line and encroach upon the roadway of Broadway at the 157th Street Station of the Interborough Rapid Transit Company. The remaining contract for which bids will be received is for frogs, switches, tracks, etc., for the 180th Street yard of the Interborough, adjacent to Bronx Park.

Power Houses, Shops and Buildings

American Electric Power Company, Wilmington, Del., has bought two Westinghouse new model multiple-retort underfeed stokers.

Texas Electric Railway, Dallas, has begun work on a new passenger and express station at Ennis. James P. Griffin, vice-president of the company, in announcing the beginning of work on the new station, said it would cost $17,000 and is to be completed by Jan. 1.

United Light & Railways Company, Grand Rapids, Mich., is contemplating a central power station in the vicinity of East Moline, Ill., with a capacity of at least 150,000 kw. and to cost approximately $10,000,000 when completed. The United Light & Railways power plant is now located at Moline, Ill., where it is in close proximity to a hydro-electric station. This combined central station, while recently expanded, will not be able to serve the rapidly growing demands of this industrial community for electrical energy and the new plant is made necessary to provide for the industrial development of the next decade.

Trade Note

Westinghouse Electric & Manufacturing Company at its South Philadelphia Works has established a general engineering division which will be devoted to the study of central-station and industrial plant problems, which involve the application of steam power apparatus such as steam turbines, condensers and reduction gears. This department will also co-operate with the sales organization in providing engineering service to purchasers of this equipment.

New Advertising Literature

Ohmer Fare Register Company, Dayton, has issued form 400, entitled "Making Money by Saving Money."

Economy Electric Devices Company, Chicago, has issued a sheet—a reprint from *Electrical Traction*—entitled "The Air Rectifier Eliminates Frozen Air."

Hauck Manufacturing Company, Brooklyn, N. Y., has issued bulletin No. 506, illustrating and describing the new Hauck Venturi low-pressure burners.

Combustion Engineering Corporation, New York, N. Y., has issued Catalog L-1, entitled "Lopulco Pulverized Fuel Systems." The pamphlet explains the Lopulco system as designed for stationary boilers.

Hale-Kilburn Company, Philadelphia, Pa., has issued a forty-page pamphlet on car seats for electric railways. The various designs of seat types for car equipment are described in detail with photographs giving the standard features of the particular type of seat.

Torchweld Equipment Company, Chicago, has issued a new catalog covering its complete line of oxyacetylene welding and cutting apparatus, lead welding, soldering, brazing and decarbonizing units, gas pressure regulators, automatic machines, generators and supplies. The catalog contains cross-sectional views of equipment with detailed explanation, is 8½ in. x 11 in. and consists of forty pages.

Garland Ventilator Company, Chicago, represented by Hegeman-Castle Corporation as general agents, has issued a twelve-page circular descriptive of the Garland steam and electric railroad ventilators. In a list of thirty-six typical orders recently received by the company are included sixteen from electric railway car builders and prominent electric railways. A list of representative railroads using Garland ventilators includes fifteen electric railways.